THE IRON TRADE REVIEW

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RAPID ADVANCES

IN PRICES OF PIG IRON AND COKE.

Heavy Sales Made — Pressure on Mills Growing Stronger— Sheet Quotations Changed.

The demand for pig iron is extremely active. Large tonnages are being purchased and prices are advancing rapidly. Although the actual requirements for consumption are undoubtedly very large, it may be seriously doubted whether some prices now quoted are not too high. In the south, the market is headed for $15 for delivery during the first half; in the east, basic is being sold at within a few cents of $19, and in the valley, $18 has been paid for Bessemer. These and other instances may be cited as typical of high quotations now prevailing, in all parts of the country and on all grades of pig iron. On the other hand, it may be stated that pig iron production is steadily increasing and that many furnaces are holding back large tonnages awaiting still further price advances. Some Virginia furnaces, for example, have large tonnages in reserve, as have also a number of Alabama stacks. Considerable investment iron is also being held back. There is enough iron stocks on the furnace yards in the Ironton district and in southern Ohio to equal the output of two good sized stacks for a year.

Pig Iron Buying

The Steel Corporation has not yet ordered any pig iron, and is understood to be having trouble in getting the desired tonnage at satisfactory prices. The Lackawanna Steel Co. has been a prominent figure in the market, having purchased 20,000 tons from one interest and arranged with another company for 25,000 tons on a conversion deal. The Lackawanna company is still in the market for a large tonnage. In the Pittsburg district alone, the sales of the week on all grades of pig iron are estimated at 75,000 tons.

Iron Ore Movement

It now seems almost certain that shipments of Lake Superior ore this year will exceed those of the previous record year 1907, when 42,266,668 tons were shipped. There has not yet been any selling of Swedish ore for 1910 and advancing trans-Atlantic freight rates are an important factor in the ore movement from the old world. There is a demand for more dock space at lower lake ports than is available.

Billets

The scarcity of billets is general and actual transactions are so few and so well guarded that it is difficult to give accurate quotations. A number of mills have refused to make quotations.

Finished Material

In finished materials, the pressure on the mills is more severe, and promises for delivery are in many cases being extended. Orders taken by the American Bridge Co. during the past week for structural material amounted to 5,000 tons, while contracts awarded independent interests foot up 13,000 tons. About 20,000 tons of plates and shapes will be required for lake freighters. Actual orders for cars are not numerous, but it is estimated that contracts for about 20,000 will soon be made. Deliveries on plates and shapes now range from three to four months from many mills. The demand for sheets is very heavy, and prices have been advanced from $1 to $2 per ton. The leading interest is operating 80 per cent of its serviceable sheet mill capacity, although the strike still continues. Independent plate mills are running practically full, and the American Sheet & Tin Plate Co. is operating 63 per cent of its capacity. Prices of rivets are still advancing. Present quotations are 1.90c for structural and 2c for boiler rivets, Pittsburg.

Pipe Line Laying

The action of the United States Circuit Court at Muskogee, Okla., restraining the state officials from forcing the constitutional provision which forbids the piping of gas from the state, becomes effective Sept. 27, and promises to have an important bearing on pipe line construction. It is expected that work will soon be started on some important pipe lines from Oklahoma into Kansas and other states.

Coke and Old Material

Coke prices are firm and advancing rapidly. The bidding on the scrap to be shipped from the Isthmian canal, estimated at about 100,000 tons in three years, discloses a wide variance, the bids ranging from $7.25 to $18.80. The contract has not been awarded. A shipment of scrap from Germany is due to arrive at an early date.

SWEDISH EXPORTERS

Jubilant Over the Prospect of Increased Demand for Ore in United States.

Washington, D. C., Sept. 22.—Interest in the reports which are certain to be made to the various departments here relative to the prospective importations of iron ore from various sections of the world, under the more liberal provisions of the tariff law, promises to be manifested upon all occasions. The Bureau of Manufacturers of the Commerce department has received, and makes public today a report received from Stockholm, indicating the interest manifested in Sweden in the prospect for increased shipments of ore to the United States.

It appears, according to this report that "there is to be held in Stockholm

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THE WEEK IN IRON CENTERS

PITTSBURG.

Heavy Sales of Pig Iron and Rapid Advances in Prices.

Office of THE IRON TRADE REVIEW,
510 Park Building, Sept. 21.

The question of deliveries on finished material has become a factor of paramount importance in the iron and steel market. Such a flood of mill orders has been sent in upon makers that shipments have fallen back almost to the record stage established in the high-tide days of 1907, and premiums paid for prompt material are becoming more frequent. The concern of steel-makers at the present time appears no longer to be that of new business or specifications but of taking care of the entries now at hand.

The situation in steel bars is the most congested in the market that the mills are now facing. Although producing capacities are being taxed, deliveries are steadily falling behind until they range from two to three months. From the rate so far maintained in September, the Carnegie Steel Co. bids fair to break all records for steel bar tonnage entered on mill books in any single month in its history. The present unmanufactured tonnage of steel products of various descriptions now accumulated for delivery by the mills of the Republic Iron & Steel Co. is almost at the highest point reached by the company during the boom year of 1907. The company is now two months behind in shipments. The Jones & Laughlin Steel Co. is also far behind with its orders, and the same condition applies to other companies. Some important makers are three to four months in arrears on plate and shape business, but other manufacturers of this material can make shipments in shorter periods. Deliveries on some grades of wire are back ten weeks and in sheets and tubular goods the mills of both the independents and of the United States Steel Corporation are filled up for a considerable time ahead.

Interest in the week has centered in the pig iron and coke markets, both of which are rapidly advancing. The coke situation continues especially feverish, but has evidence of good support, as large consumers are showing signs of anxiety in seeking to cover for their future needs and some important transactions have been made. About 4,000 serviceable ovens or approximately 11 per cent of the capacity of the Connellsville regions are still idle, due in a large measure to the inadequate supply of labor, which has shown little improvement. Pittsburg sellers disposed of fully 75,000 tons of pig iron in the week.

Pig Iron.—A heavy volume of transactions has registered another sharp advance in pig iron prices in the past week, especially in the Bessemer and foundry grades. The market is in a very active state and makers are extremely bullish, some predicting $20 metal the first of the year. The inquiry is large and well scattered except as to basic iron, which is lagging.

Bessemer continues to hold the position of first importance in the market. Sales have been made for first half at $18, valley, a local casting interest having taken 1,300 tons, part of which was closed at this figure. The remainder for the rest of this year brought $17.50, valley, which represents the present market. Some makers are asking $18 for this year. W. P. Snyder & Co. were the largest sellers, disposing of 48,000 tons in the week, including 20,000 tons to the Lackawanna Steel Co., 10,000 tons to the Republic Iron & Steel Co., 3,000 tons to the Midvale Steel Co., and 15,000 tons to a casting interest. All this iron is for delivery up to Jan. 1, and was sold at $17.50, valley, with the exception of the 15,000-ton lot, which is on a sliding scale basis. The Lackawanna Steel Co. is still in the market for 40,000 to 50,000 tons for first half, and the Youngstown Sheet & Tube Co. for 15,000 tons. It is also reported that the Cambria Steel Co. may shortly buy a large block. This company has not been a buyer of Bessemer since 1907. Nothing has yet been done as far as learned with the contemplated purchase of the United States Steel Corporation. Malleable sold in the week at $17, valley, for both prompt and first half, but some makers have now advanced to $17.25, valley.

One large producer of foundry iron which has refrained from accepting next year's business, opened its books in the week and has entered a heavy tonnage of this grade. It is now well sold up on some of its furnaces. The No. 2 grade appears to have settled to a minimum of $16.50, valley, for this year, as some of the makers who have been desirous of getting an accumulation upon their books are stronger in their views of prices, and no weak spots are apparent. For first half, $17, valley, appears the usual holding price. Basic iron is moving slowly and is quoted from $15.75 to $16, valley, although some sellers are declining business at the higher figure because of the disparity between this price and that of Bessemer.

Inquiries in the market include 2,000 tons of second quarter Bessemer to a local maker of railroad supplies and 1,000 tons of Bessemer, 1,000 tons of gray forge and 1,000 tons of No. 2 foundry for first half to the Westinghouse Air Brake Co. The Westinghouse Electric & Mfg. Co. is also inquiring for foundry iron for its Cleveland plant for first half.

Several of the large makers of southern iron have advanced their prices to $14.50, Birmingham, for No. 2 for forward delivery, which applies principally to next year's contracts. Some sales at this price are reported.

On prompt and future shipment this year on northern iron, we quote as follows:

Bessemer, valley	$ 17.50
Bessemer, Pittsburg	18.40
No. 2 foundry, Pittsburg	17.40
Gray forge, Pittsburg	16.15 to 16.40
Basic, valley	15.75 to 16.00
Basic, Pittsburg	16.65 to 16.90

Ferro-Alloys.—Not a great deal of new buying is current in ferro-manganese, but some small sales are being made. There has been some inquiry for the last half of next year and $46 seaboard has been quoted. In 50 per cent ferro-silicon, the market is in the hands of domestic makers, as foreign producers are not inclined to meet prices being made. A local steel company has just taken 100 tons of near-by shipment at about $62.50 Pittsburg. Some domestic makers of the lower grades of ferro-silicon are still anxious for orders and are naming prices around the quoted figures for forward deliveries with 50 cents advance for first half. Quotations on foreign material are considerably higher.

We quote ferro-manganese at from $42.50 to $43, Baltimore, prompt shipment, or for delivery this year and the first half of 1910, $44 to $45, Baltimore. The freight from Baltimore to Pittsburg is $1.95.

Fifty per cent ferro-silicon is quoted at $62.50 to $63.50, Pittsburg; domestic, 12 per cent, $25; 11 per cent, $24; 10 per cent, $23, Pittsburg. The foreign grades are held at advanced prices.

Plates.—Six or eight steel freighters for lake traffic which will require about 20,000 tons of material are in the market and will be awarded soon. No important car orders have re-

cently been entered, but a number of roads are interested in making purchases of this character, and it is estimated there are 20,000 cars in sight. The matter of deliveries of plates and other structural material has assumed prime importance and a number of projects are being temporarily held in check because of inability to obtain reasonable shipments. With important interests, deliveries on plates now range from three to four months. Bookings are consistently heavy particularly in structural plates. There is not a great deal of activity in tank or pipe line steel. Prices are very firm at the quoted schedule which is as follows:

Tank plates, ¼-inch thick, 6¼ to 100 inches, 1.50c. Extras are as follows per 100 pounds: Boiler and flange steel plate, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches, up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edge, 0.10c; under 3/16 to and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—The insistent demands for deliveries by the mills continue to be made by sheet consumers and there is every evidence that the users of this product generally are enjoying active business. Specifications remain very heavy, causing retarded shipments which now run six to eight weeks on some grades. Jobbers are stocking for the fall trade. A heavy tonnage in corrugated iron sheets has been placed in this territory in the past 30 days, one lot of 800 tons for manufacturing buildings having just been closed. Sheet prices are firmer and the quoted schedule is being well maintained, although some independents are asking advances of about $1 a ton over it. The operations of the American Sheet & Tin Plate Co. this week are 141 mills or 80 per cent of serviceable capacity. We quote present minimum prices as follows:

Blue annealed sheets, Nos. 3 to 8, 1.60c; Nos. 9 to 10, 1.65c; Nos. 11 and 12, 1.70c; Nos. 13 and 14, 1.75c; Nos. 15 and 16, 1.85c; box annealed sheets, Nos. 10 to 12, 1.85c; Nos. 13 and 14, 1.90c; Nos. 15 and 16, 1.95c; Nos. 17 to 21, 2c; Nos. 22 to 24, 2.05c; Nos. 25 and 26, 2.10c; No. 27, 2.15c; No. 28, 2.20c; No. 29, 2.25c; No. 30, 2.35c; galvanized sheets, Nos. 13 and 14, 2.25c; Nos. 15 and 16, 2.40c; Nos. 17 to 21, 2.50c; Nos. 22 to 24, 2.65c; Nos. 25 and 26, 2.85c; No. 27, 3.05c; No. 28, 3.25c; No. 29, 3.40c; No. 30, 3.65c; painted roofing sheets, $1.55 per square for No. 28 gage, 2½-inch corrugation, and galvanized roofing sheets, $2.80 per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—Although some business has been offered for such shipment, makers of tin plate are not disposed as yet to fix prices on next year's deliveries. Outputs are well sold up for the remainder of the present year and some independents are asking as much as 25 cents per box advance on any additional business that may be offered. The approaching end of the canning season is providing a considerable volume of specifications for filling in requirements, and there is some tendency among tin plate users to anticipate their future needs. The independents are running practically full while the leading interest this week has active 153 mills or 63 per cent of its serviceable capacity. We quote the present market as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.40 to $3.65 f. o. b. mill, Pittsburg district. Terms 30 days, less 2 per cent for cash in 10 days.

Rails and Track Material.—Western roads are buying rails for next year's delivery more freely than the eastern lines, but this movement is expected to shortly extend to the mills in this section, as there are many preliminary indications of an extremely heavy year approaching. The Carnegie Steel Co. the past week entered 6,000 tons of standard sections in miscellaneous lots and about 2,500 tons of light rails. Light rail prices are strong. There is a very heavy demand for track fastenings and some notable contracts have been recently entered. Standard spikes are very firm at 1.70c Pittsburg. We quote the market on Bessemer rails as follows, the base price for open-hearth rails being $30 mill:

Fifty-pound and heavier, 500-ton and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 8-pound, $31; 12-pound, $30; 16 to 25-pound, $28; 30 to 35-pound, $28.75; 40 to 45-pound, $27; angle splice bars for standard sections, 1.50c, Pittsburg; standard spikes, 1.70c to 1.75c, Pittsburg; hand spikes, 1.75c to 1.85c, Pittsburg.

Steel.—While some sales of base sizes of Bessemer billets have been made at considerably higher prices, the present market appears to range from about $25 to $25.50, Pittsburg. A sale of 1,000 tons of small Bessemer billets for delivery this year was negotiated this week at $26.50, Pittsburg. Some purchases of 4 x 4 Bessemer billets have recently been made at $25 mill, but buyers are finding it more difficult to duplicate this price. The billet market has been subject to more or less indefiniteness of late owing to the refusal of a number of the mills to make quotations, and high prices intended in some cases to discourage purchases have been accepted. Open-hearth billets are especially scarce and some fancy prices are heard. Heavy sales of open-hearth billets aggregating about 30,000 tons are reported from eastern territory. Bessemer sheet bars have sold as high as $27 Pittsburg, but some late sales have been made around $26 delivered Pittsburg territory. Foreign importers report that German sheet bars can be laid down at Baltimore at $28, duty paid. Forging billets are commanding high prices.

Bessemer 4 x 4 billets with 0.25 carbon and less are regularly quoted at $25 to $25.50, Pittsburg, with the usual extras for size and analysis, and open-hearth rolling billets from $26 to $26.50, Pittsburg. Forging billets are held at $29 to $30, Pittsburg. Sheet and tin bars are quoted at $26 to $27, Pittsburg.

Hoops and Bands.—The large cooperage trade is coming into the market more freely and is contracting quite well, although some shops are still not running full. Better orders and inquiries are the rule in hoops and the entire market is stronger and more promising. Prices are firm in that 1.50c Pittsburg is now regarded as the minimum. Bands are moving well as the specialty manufacturers are specifying in a steady volume. We quote the market as follows:

Hoops in carload lots, 1.50c to 1.60c; in less than carload lots, 1.60c to 1.70c; bands, 1.35c to 1.40c, base half extras as per standard steel.

Merchant Bars.—The new classification of extras on steel bars announced by the leading interest, as reported last week, is being followed in effect by the independent companies. On Oct. 1, the Republic Iron & Steel Co. will issue a new card doubling the full extras and will quote

half extras on the card as under the plan pursued in the past. These prices will be equivalent to those made by the leading interest, which is now asking net extras instead of the former half extra arrangement of quoting. The flood of steel bar tonnage to the mills continues unabated and capacities are being worked at the highest rate. Unmanufactured tonnage on mill books with some makers is now close to that of the boom times of 1907 and deliveries run from eight to 12 weeks. Steel bar stocks generally are not heavy, as jobbers and manufacturers have had little opportunity to gain over consumptive needs. Instances of some large premiums having been paid on small lots of steel bars for quick shipment are reported. Bar iron is stronger and more active, prices in Pittsburg and adjacent territory ranging from 1.50c to 1.60c, mill. Makers are predicting further advances in the near future. The new discounts on shafting are reported to be well observed and the demand is brisk. We quote the present market as follows:

Common iron bars, 1.50c to 1.55c, Pittsburg; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator, 1.35c to 1.40c; channels, angles, zees, tees, under 3-inch, 1.45c; all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds, 0.15c advance; less than 1,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 57 per cent in carloads and 52 per cent in less than carloads, delivered in base territory.

On cold rolled strip steel, width 1½ inches and wider, and 0.100 inch and thicker, we quote base prices for 100 pounds, $3.05 on hard, and $3.30 on soft.

Structural Material. — The belated deliveries on plain material are turning to the market at this time the attention of prospective builders of next year and some interests are already specifying for work to be done in the spring season and later. It is expected that considerable of next year's business will make its appearance in the market at an earlier date than usual because of the prevailing conditions. Important makers of shapes are so filled up that they are not promising deliveries on standard material in less than from three to four months, which with fabrication work would bring complete shipments well into 1910 on orders now placed. Some of the other mills are however not so congested with booked business. Bids have gone in on the 1,200 tons for the addition to the plant of the McKeesport Tin Plate Co. at Port Vue, Pa., but no award has yet been made. Another local contract involving 1,200 tons is also up for consideration of structural interests. We quote the market on structural shapes as follows:

Beams and channels, 15-inch and under, 1.50c; over 15 inches, 1.50c; to 1.55c; zees, 1.40c to 1.45c; tees, 1.40c to 1.45c; angles, from 3 to 6 inches, 1.40c to 1.45c; over 6 inches, 1.50c to 1.55c; universal and sheared plates, 6¼ inches wide and wider, 1.50c.

Merchant Pipe. — Notification has just been received in Pittsburg that the injunction granted by the United States circuit court at Muskogee, Okla., restraining the state officials from enforcing the constitutional provision which forbids the piping of gas from the state will become effective Sept. 27, the appeals and exceptions to the original decision having been disposed of. This action of the court is of considerable importance in pipe line construction, and it is predicted that it will be shortly followed by the inauguration of work upon several 18-inch lines into Kansas and other territory. The Monongahela Natural Gas Co. is still negotiating for 15 miles of 16-inch and another gas company is in the market for 15 miles of steel casing for Oklahoma, while other important deals are pending. The tone of the tubular market is very strong and there is a general expectation of an advance soon in steel merchant pipe. Jobbers have their fall requirements well filled at the discounts of 81 and 5 and are not showing much buying activity at present, which is due in a large part to the attitude of the mills in declining to sell far ahead. The mills generally are well sold up and deliveries with some range from six to eight weeks. We quote the folowing official discounts on merchant pipe, subject to an additional one point and five off to jobbers:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch.....	72	56	66	..
⅜ inch	73	59	67	53
½ inch	76	64	70	58
¾ to 6 inch	80	70	74	64
7 to 12 inch	75	60	69	52
PLUGGED AND REAMED.				
1 to 4 inch	78	68	72	62
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	65	53	59	47
½ to 4 inch	72	60	56	54
4½ to 8 inch	68	56	62	50
DOUBLE EXTRA STRONG PLAIN ENDS.				
½ to 8 inch.....	61	50	55	44

Boiler Tubes.—Some large orders in locomotive tubes have recently been placed in connection with new motive equipment awards by railroads and important contracts are pending. Some companies are also getting a fair business in merchant tubes, but the market is picking up slowly. Aggressive selling tactics employed by some interests have resulted in some close prices being made in tubes. We quote the following official discounts on lap-welded steel boiler tubes to jobbers in carloads:

1 to 1½ inch	50
1¾ to 2¼ inch	62
2½ inch	64
2¾ to 5 inch	70
6 to 13 inch	62

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destinations east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

We quote the following official discounts on charcoal iron tubes to jobbers:

1 to 1½ inch	45
1¾ to 2¼ inch	45
2½ inch	50
2¾ to 5 inch	57
6 to 13 inch	45

Wire Products.—Some contracts in nails and wire at the quoted schedule are being made for 60 days delivery, but the needs of jobbers and manufacturers are well covered through contracts made at previous lower prices. The jobbers are beginning to specify for nails and wire for fall trade and with some companies the wire tonnage asked for by manufacturing users is so heavy that allotments are being made by the mills in accordance with the past needs of these respective patrons. On some grades of wire the leading interest is 10 weeks behind in deliveries. Prices are firm and we quote as follows:

Wire nails, jobbers' carload lots, $1.80; retailers' carload lots, $1.85; painted barb wire, jobbers' carload lots, $1.80; retailers' carload lots, $1.85.

Wire Rods.—Business recently offered in wire rods has been rejected by leading makers without quoting on account of their own heavy needs of steel. The market is largely nominal and we quote at from $31 to $32, Pittsburg, on Bessemer and open-hearth rods.

Coke.—While the coke market sentimentally is in a very excited state over the recent rapid advance, there is more evidence of substantial footing for its present movements. Not a great tonnage of coke has yet been closed at the higher prices, but some important transactions have been made and many of the large consumers have seriously taken up the consideration of their next year's requirements, which aggregate a very heavy total. The market is displaying a good absorptive power and spot coke is not freely obtainable, as makers are quite

independent in their ideas of prices. There is considerable spot inquiry. Reports of furnace coke contracts for next year at high prices are current, but some of these cannot be confirmed. A sale of 2,500 tons to a Cleveland furnace for first quarter was made through a middleman on a basis equivalent to about $2.60. ovens. In foundry coke, $2.75 is being quoted on desirable contracts, and higher prices for short periods. Specifications on contracts are coming in so heavily that one of the largest interests has withdrawn completely from the spot market. The labor situation in the Connellsville region shows little change. We quote furnace coke for prompt delivery at $2.50 to $2.65, ovens, and on contract from $2.65 to $2.85, ovens. On first class Connellsville foundry coke the range is from $2.50 to $2.60, ovens, for prompt, and from $2.60 to $2.85, ovens, on contract. The *Courier's* figures for the week ending Sept. 11 show 32,728 ovens active, with an output of 424,568 tons, compared with 32,474 active ovens and a production of 421,320 tons the previous week.

Old Materials. — The tendency of most holders of old material to retain their accumulation for higher prices remains a strong characteristic of the market. The dealers continue prominent in this policy and are holding some heavy stocks, while the railroads are said to be pursuing a like course of action. Consumers of scrap are buying cautiously and are finding difficulty in closing for any tonnage of size at what they regard as reasonable prices. Middlemen have been given authority to pick up large blocks for them, but have been unable to do so. The mills are showing willingness to pay up to $17.50, delivered, for heavy steel, and are taking small lots at this figure, but many sellers are asking $18. Wrought scrap is moving more freely, but the foundries are reluctant to pay present prices for cast scrap because of pig iron now coming to them under contracts placed at previous lower figures. We quote gross tons, delivered in the Pittsburg district, as follows:

Heavy melting scrap	$17.50 to 17.75
Rerolling rails	18.00 to 18.50
Bundled sheet scrap	15.50 to 16.00
Iron axles	26.50 to 27.00
Old iron rails	19.50 to 20.00
No. 1 wrought scrap	18.50 to 19.00
Old car wheels	17.00 to 17.50
Low phosphorus	21.00 to 21.50
Machine shop turnings	13.00 to 13.50
Cast borings	11.00 to 11.50
No. 1 cast scrap	16.00 to 16.50
Malleable	16.00 to 16.50
Stove plate	12.50 to 13.00

The Toledo Ship Building Co., Toledo, has received an order from Eastern furnace interests for a bulk freighter 524 feet long for 1910 delivery.

CHICAGO.

Pressure on Mills Stronger—Pig Iron Prices Advancing.

Office of THE IRON TRADE REVIEW, 1328 Monadnock Block, Sept. 21.

This has been another week in which the gradual increase in strength in the upward movement has been clearly shown. No line of iron and steel manufacture seems to offer anything like an exception to the general rule of large and small orders pressing in upon the mills, while purchasers of weeks ago are sending in specifications with increasing urgency for early execution. In some instances, there is enough business on the books to provide work for the best part of a year, if no further orders were taken, while the pressure of accumulated business taken by some of the mills increases with every day, and they are falling further and further behind in the filling of their orders. The position of pig iron grows stronger each day, and this week a further advance of a half dollar is seen in quotations, with maximum prices looked upon as only temporary, and expected to become the minimum limit any day. The Iroquois Iron Co.'s "B" furnace was lighted on Wednesday last, as anticipated in this report last week, and is running very satisfactorily. From Virginia, it is reported that the Pulaski furnace will be blown out about Oct. 1, for re-lining. The local finished material makers are still further increased this week by the starting of the Riverdale Iron & Steel Co.'s mill on merchant iron.

Pig Iron.—During the past week, there has been an aggregate tonnage in pig iron sales which has amounted to a considerable total. The small-lot sale has been prominent, but there have been quite a goodly number of fair-sized contracts. One of the features of the week has been the purchase of 1,700 tons of silvery iron by local foundry. All along the line, increased strength is noted, and both northern and southern foundry irons are 50 cents higher than last week, with prospects of further advances within a very few days. The $14 price on No. 2 foundry, at Birmingham, has disappeared, and no furnace is transacting business on a lower basis than $14.50, Birmingham, while some are holding themselves out of the market by refusing to sell at a lower figure than $15, at which figure no business has been placed, unless it be in the case of some specially favored brand. It is within reasonable probability that this higher figure will be a common one within a week. The northern furnaces are fully as firm in their attitude, and $18, Chicago, no longer is possible.

Some furnaces are holding at $18.50, f. o. b. furnace, which closely approximates $19, Chicago. In the present situation, which is one of transition, it fairly may be said that the $14.50, Birmingham, figure represents the market for southern foundry iron, and $18.50, Chicago, the northern, but these prices are not expected to hold for many days. In the past day or two, a number of offers based on quotations made less than a week ago, were refused and the quotations withdrawn.

We quote for Chicago delivery, as follows:

Lake Superior charcoal	$19.50 to 20.00
Northern foundry No. 1	19.00 to 19.50
Northern foundry No. 2	18.50 to 19.00
Northern foundry No. 3	18.00 to 18.50
Southern foundry No. 1	19.35 to 19.85
Southern foundry No. 2	18.85 to 19.35
Southern foundry No. 3	17.60 to 18.10
Southern foundry No. 4	17.10 to 17.60
Southern No. 1 soft	19.35 to 19.85
Southern No. 2 soft	18.85 to 19.35
Southern silveries, 4 per cent silicon	18.35 to 18.85
Southern silveries, 5 per cent silicon	18.85 to 19.35
Southern silveries, 6 per cent silicon	19.85 to 20.85
Jackson Co. silveries, 6 per cent.	20.40
Jackson Co. silveries, 8 per cent.	21.40
Jackson Co. silveries, 10 per cent	22.40
Malleable Bessemer	17.75 to 18.25
Standard Bessemer	19.50 to 20.00
Alabama basic	18.50 to 19.00

Billets.—The steel market is fully up to the high mark of strength prevailing for weeks past. No billets are for sale in this territory and they are very scarce, apparently both east and west. It is impossible to name any quotation, as there is no market to make quotations.

Merchant Bars. — Continued and additional strength characterizes this market, and previous minimum prices on bar iron have disappeared, being replaced by maximum prices of previous weeks. To a large extent, sales are being restricted to this year's delivery, save in exceptional cases, where a favored customer may be able to go beyond Jan. 1. It is safe to say that mills are from eight to ten weeks behind on their orders. Another local interest has joined the ranks of the producers, the Riverdale Iron & Steel Co. having started its mill on merchant bars, on Monday of this week. The Republic Iron & Steel Co. has all its western mills running full. This company is holding bar iron at 1.55c, Chicago, and soft steel bars at 1.50c, Pittsburg, or 1.68c, Chicago. The Blue Island Car & Equipment Co. is running both its furnaces single turn, and is figuring on putting on a night shift in a short time. Store business is growing, and prices are moving upward.

We quote for Chicago delivery, as follows:

Bar iron, 1.50c to 1.55c; hard steel, 1.45c to 1.50c; soft steel bars and bands, 1.58c to 1.63c, half extras, soft steel angles, less than 3 x 3, 1.63c to 1.68c, half extras; hoops, 1.63c to 1.68c base, full extras; planished or smooth finished tire steel, 1.63c to 1.68c; iron finish, up to 1½ x ½ inch, 1.63c base, tire card; iron finish, 1½ x ½-inch and larger, 1.43c to 1.48c base, steel card; channel for solid rubber tires, ¾ to 1 inch, 1.93c to 1.98c; and 1⅛ inch and larger, 1.83c to 1.88c; smooth finished machinery steel, 1.73c; flat sleigh shoe, 1.53c; toe calk steel, 2.03c; spring steel, 2.08c; crucible spring steel, 2.58c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 60 per cent off the list for carload lots, and 55 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.80c, base, full extras; soft steel bars, 1.80c to 1.90c per 100 pounds base, plus half extras; soft steel hoops, 2.25c, full extras.

Structural Material.—The past week has been a quiet one, except in the way of small orders, which have been numerous. There are a number of large building projects, both local and outside, on paper, and inquiries amount to a large total, especially in small-tonnage contracts, which probably will be closed very soon. The city of St. Louis will be in the market shortly for at least 12,000 tons for the Chouteau bridge, which is to be built by the city and operated as a free bridge to foot and vehicle passage. The bridge also is designed and intended to carry railroad traffic. The American Bridge Co. secured the contract for the 1,200 tons of steel for the station of the Houston Belt & Terminal Co., at Houston, Tex. The Northern Pacific depot, at Tacoma, Wash., 800 tons, went to the Minneapolis Steel & Machinery Co.

We quote mill prices for structural shapes, Chicago delivery, as follows:

Beams and channels, 15-inch and under, 1.68c to 1.73c. For extras see Pittsburg report. Local store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $1.90 per 100 pounds; angles over 6 inches, $2.00 per 100 pounds base; beams, 3 to 15 inches, inclusive, $1.90 per 100 pounds base; channels, 3 inches and larger, $1.90 per 100 pounds base.

Rails and Track Supplies.—Heavy sales of standard section rails continue, and the local interest's bookings up to date amount to at least 350,000 tons. Light rails are commanding increased attention, and the growing tonnage in this line would seriously embarass the leading interest, with the heavy demand upon its mills for the heavier sections, were it not that, during the dull period of the past year, a heavy stock of light section rails was accumulated.

See Pittsburg report for prices on standard sections. On light rails, Chicago delivery, we quote as follows:

Light rails, 40 and 45-pound, $26; 30 and 35-pound, $26.75; 16, 20 and 25-pound $27; 12-pound, $28. In lots of 250 to 500 tons a reduction of 60 cents a ton from these prices is made; lots of 500 tons and up carry a reduction of $1 a ton. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.75c to 1.85c; smaller size spikes, 1.85c to 1.95c base; track bolts with square nuts, 2.25c to 2.35c; with hexagon nuts, 2.40c to 2.50c.

Plates.—Specifications are coming in at a heavy rate, and these, combined with the new business being booked, are in excess of mill capacity by a heavy margin.

We quote, for Chicago delivery, as follows:

Tank plates, ¼-inch thick, 6¼ to 100 inches, 1.68c to 1.73c. For extras see Pittsburg report. Store quotations are without change, as follows:

Tank steel, ¼-inch and heavier up to 72 inches wide, 1.90c to 2.00c; from 72 inches wide to 96 inches wide, 2.00c to 2.10c; 3/16-inch up to and including 60 inches wide, 2.00c to 2.10c; 72 inches, 2.25c to 2.35c; No. 8 up to 60 inches wide, 2.05c to 2.15c. Flange and head quality, 25c extra.

Sheets.—There continues to be a heavy business handled in this line, both in mill orders and spot requirements from store. Prices are very firm.

For mill prices see Pittsburg report. Freight to Chicago, 18 cents. We quote store prices at Chicago as follows:

No. 10, 2.10c to 2.20c; No. 12, 2.15c to 2.25c; No. 14, 2.20c to 2.30c; No. 16, 2.30c to 2.40c; Nos. 18-20, 2.50c to 2.60c; Nos. 22-24, 2.55c to 2.65c; No. 26, 2.60c to 2.70c; No. 27, 2.65c to 2.75c; No. 28, 2.75c to 2.85c; No 30, 3.05c; galvanized sheets, Nos. 10 to 16, 2.90c to 3c; Nos. 18 and 20, 3.05c to 3.15c; Nos. 22 to 24, 3.20c to 3.30c; No. 26, 3.40c to 3.50c; No. 27, 3.60c to 3.70c; No. 28, 3.80c to 3.90c; No. 30, 4.20c to 4.30c.

Wire Products.—More liberal specifications and more urgent ones are reported in the wire product market this week. A large business is being done in barbed wire and open-wire fencing, and the fall trade in all lines of wire goods seems to be in full swing. A somewhat improved condition in the southern trade is reported. We quote, Chicago delivery, as follows:

Wire nails, jobbers' carlots, $1.98; retailers' carload lots, $2.03; retailers, less than carload lots, $2.13; painted barb wire, jobbers' carload lots, $1.98; retailers, carload lots, $2.03, with 30c for galvanizing; plain wire to jobbers, carload lots, $1.78; staples, $1.98.

Merchant Pipe and Tubes.—A very good demand from the jobbing as well as the manufacturing trade is the report from this branch of the steel business, this week. There is a marked increase in the inquiry from boiler shops. We quote, for lap-welded tubes, out of store, 65 off, and for charcoal, 50 off. For new discounts see Pittsburg report.

Cast Iron Pipe.—There is a large routine business being booked in this line, with an occasional good-sized order. Railroads continue to be good buyers, the business from this source, for the past week, amounting to about 4,000 tons. The United States Cast Iron Pipe & Foundry Co. booked an order for 5,000 tons of pipe for municipal work at West Seattle, Wash. The sizes ranged from 6-inch to 30-inch pipe. Prices finally have been forced up by the continued advance in pig iron prices. We quote as follows:

Four-inch water pipe, $28; 6 to 14 inches, $27; larger sizes, $26; gas pipe, $1 a ton higher.

Old Material.—This market holds remarkably strong, and a very good-sized tonnage is said to be going into the hands of consumers. Prices on all grades and kinds of scrap, especially steel, are held firmly, while some advance is noted in a number of instances.

Old car wheels	$18.50 to 19.00
Old iron rails	19.00 to 19.50
Rerolling rails (4 ft. and over)	17.50 to 18.00
Old steel rails (2 ft. and under)	17.00 to 17.50
Light section relayers, 45 lbs. and under subject to inspection	**21.00 to 23.00**
Relaying rails, subject to inspection	**22.50 to 23.50**
Frogs, switches and guards	16.00 to 16.50
Heavy melting steel	16.00 to 16.50
Shoveling steel	15.50 to 16.00

We quote, net tons, as follows:

No. 1 R. R. wrought	$15.50 to 16.00
No. 2 R. R. wrought	14.25 to 14.75
Arch bars and transoms	17.75 to 18.00
Knuckles, couplers and springs	14.75 to 15.25
Shafting	16.50 to 17.00
Iron car axles	20.50 to 21.00
Steel car axles	19.25 to 19.50
Locomotive tires	16.00 to 16.50
Dealers' forge	12.50 to 13.00
Pipes and flues	11.50 to 12.00
No. 1 cast, 150 lbs. and less	15.00 to 15.50
No. 1 busheling	12.75 to 13.25
No. 2 busheling	9.25 to 9.75
No. 1 boiler cut	11.25 to 11.75
Boiler punchings	14.00 to 14.50
Cast and mixed borings	7.00 to 7.50
Machine shop turnings	9.75 to 10.25
Railroad malleable	14.75 to 15.25
Agricultural malleable	13.00 to 13.50
Stove plate and light cast scrap	13.00 to 13.50
Angle bars, splices, etc. (iron)	18.00 to 18.50

CLEVELAND.

Heavy Buying by Lackawanna—Slow Delivery of Finished Material.

Office of THE IRON TRADE REVIEW,
Browning Building, Sept. 21.

Iron Ore.—The question how to provide dock space to meet the many demands is becoming serious. The movement from the mines is heavy, and furnace interests are making application for more dock room than is available. Sales of moderate tonnages of ore continue as for a number of weeks.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.00; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—The market is extremely strong and quotations are advancing rapidly. For No. 2 foundry, Cleveland furnaces have advanced their quotation to $17.75, delivered in the city for prompt iron, and $17, Cleveland furnace, for outside delivery, is now minimum for either prompt or future delivery. In addition to 20,000 tons of Bessemer purchased from W. B. Snyder & Co., the Lackawanna Steel Co. has contracted for 25,000 tons of Bessemer with a Cleveland agency, which will make the pig iron from ore furnished by the Lackawanna company. Several interests have withdrawn their quotation of $17.50, valley, made to the Steel Corporation on Bessemer pig iron. Some makers of basic are holding for the same price as Bessemer, although no sales have been made so far at these high prices. For prompt shipment we quote delivered in Cleveland, as follows:

No. 1 foundry	$ 18.25
No. 2 foundry	17.75
No. 3 foundry	17.25
No. 2 southern	17.85
Gray forge	16.15 to 16.40
Bessemer	18.40 to 18.90
Lake Superior charcoal	19.50 to 20.00
Jackson Co. 8 per cent silvery	20.05

Coke.—The coke market continues very strong. On Connellsville furnace coke, we quote $2.50 to $2.65 for prompt, and $2.65 to $2.85 for the first half of next year. On Connellsville foundry, we quote $2.50 to $2.65 for prompt, and $3 to $3.25 on contract.

Finished Material.—A contract for 1,700 tons of shapes and plates for the Union Dock Co. is pending and will probably be awarded to the Jones & Laughlin Steel Co. One interest declined the tonnage on account of inability to deliver in less than three months. The contract for the buildings for the new Upson plant has not yet been awarded. The order for the structural material for the Brown building on Euclid avenue, concerning which there has been considerable delay, has finally been awarded to the Jones & Laughlin Steel Co. About 1,200 tons will be required.

Drawers of steel shafting appear to be upholding the general price outlined Sept. 1, which was 57 per cent off for carload lots and 52 per cent off for less than carload lots. While some jobbers have been selling at slightly lower rates, it is expected that they will have little stock to offer after Oct. 1, when the price of 1.30c for bars under contract will end.

Rivet prices continue to advance, present quotations being 1.90c on structural and 2c on boiler rivets, Pittsburg.

Old Material.—Steady advances in Bessemer iron have strengthened scrap prices generally, and although the local market is rather dull, dealers are maintaining prices with little difficulty. The tendency has been locally to keep quotations down on heavy steel, but in view of sharp advances in pig iron we feel justified in quoting this item at an advance of a dollar over last week's quotation. Our quotations, f. o. b. Cleveland, are as follows:

Old iron rails	$19.00 to 19.50
Old steel rails (re-rolling)	16.50 to 17.00
Old steel rails (under 6 feet)	16.50 to 17.00
Old car wheels	16.00 to 16.50
Old steel boiler p'ate	14.50 to 15.00
Malleable iron (railroad)	16.00 to 16.50
Steel axles	19.50 to 20.00
Malleable iron (agricultural)	14.50 to 15.00
Heavy steel	16.50 to 17.00
Country mixed steel	14.50 to 15.000
Low phosphorus	19.50 to 20.00

We quote, net tons, as follows:

No. 1 R. R. wrought	$15.50 to 16.00
No. 1 busheling	14.00 to 14.50
No. 1 machine cast	14.50 to 15.00
Iron axles	20.50 to 21.50
Axle turnings	11.50 to 12.00
Machine shop turnings	10.00 to 10.50
Grate bars	12.00 to 12.50
Pipes and flues	12.50 to 13.00
Tank iron	12.00 to 12.50
Hoop and band iron	10.00 to 10.50
Sheet iron	8.50 to 9.00
Wrought drilling	10.00 to 10.50
Stove plate	12.00 to 12.50
Cast borings	8.00 to 8.50

CINCINNATI.

Pig Iron Sales Being Steadily Made—Wise County Coke Rises Sharply.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Sept. 21.

Pig Iron.—There is a continued steady buying of pig iron and there was a fairly liberal aggregate tonnage of orders placed through agencies here during the week. Interest appears to have been largely in southern iron, both for deliveries over the remainder of the year and for next year. The leading interest in cast iron pipe has bought some additional tonnage of prompt shipment iron at $14, Birmingham. Most of the sales for this year's delivery have been on the basis of $14, Birmingham, for No. 2 foundry, but for next year sales at the close of the week were made at $14.50, Birmingham basis, and this price seems to be minimum at this time. The southern market is strong and furnaces are advancing their views and restricting selling agents as to tonnage commitments. For the remainder of the year $14, Birmingham, can still be done, but some producers have decided to demand $14.50 for all deliveries. The furnace books in the south have not been opened beyond the first quarter of the year. Virginia furnaces have advanced their prices to $15.50, at furnace, for this year, and $16 for first quarter of next year. The southern Ohio furnaces are quoting $16 for this year and $16.50 for the first half of next year for No. 2 foundry at furnace. As this makes northern iron relatively lower than southern in this territory some of the southern Ohio producers have withdrawn from the market for the present. Southern iron has sold in such a scattering way, regardless of the price of northern, that it appears that users of southern have though best to cover their wants before prices made any further advance, although a little northern has been sold in competition with southern, owing to the lower delivered price. There is some inquiry pending, but large part of the sales are the result of contact with buyers and salesmanship. A Michigan melter bought about 2,000 tons during the week, 400 tons of which was for prompt shipment. A sale was made in Louisville of 1,500 tons for first quarter of next year's delivery at $14.50, Birmingham. An Ohio melter is in the market for 3,000 to 4,000 tons of Bessemer iron. There are several 1,000 and 2,000-ton lots under negotiation, but the details are not made public. Some southern furnaces are asking $15 for first quarter of next year. The attitude of southern producers in limiting the tonnage which sales agents may offer and requiring that large transactions be submitted before acceptance indicates that a continued advancing tendency in prices is regarded as a probability by the southern furnaces and they are unwilling to book their entire first quarter output at present quotations, especially while the demand continues in its present volume. We quote for prompt delivery and for delivery over the remainder of the year, delivered Cincinnati, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, as follows:

Southern foundry No. 1	$ 17.75
Southern foundry No. 2	17.25
Southern foundry No. 3	16.75
Southern foundry No. 4	16.25
Southern No. 1 soft	17.75
Southern No. 2 soft	17.25
Southern gray forge	15.75 to 16.00
Northern No. 1 foundry	17.70
Northern No. 2 foundry	17.20
Northern No. 3 foundry	16.70
Jackson county 6 per cent silicon	18.70
Jackson county 8 per cent silicon	19.70
Jackson county 10 per cent silicon	20.70

Finished Material.—Specifications on contracts are continuing in liberal volume. Mill deliveries are not improving and the best that can be done is from four to eight weeks according to the material wanted. Premiums are being paid for early delivery where a mill can be found to take the order. Prices are strong and advancing, although there is very little contracting, as contracts have all been made. Jobbers are having a good demand from stock as the manufacturers are willing to pay the jobbers' price for early delivery in many instances.

Coke.—There is some contracting for furnace coke, but the foundries are mostly covered, and are taking their coke on contracts liberally and the movement is good. Shipments are being made with no particular delay, as the car supply is ample in most districts. Ovens are advancing prices in all districts and the Wise county fields made a decided advance in quotations this week. Quotations in the leading producing districts are as follows:

Connellsville district:	Prompt shipment.	Remainder of year.	First half 1910.
Fdy. coke.	$2.40 to 2.75	$2.40 to 2.75	$2.75 to 3.25
Fur. coke.	2.25 to 2.40	2.25 to 2.50	2.65 to 3.00
Wise county district:			
Fdy. coke.	2.50	2.50	2.75
Fur. coke.	2.00 to 2.15	2.00 to 2.25	2.25 to 2.35
Pocahontas district:			
Fdy. coke.	2.25 to 2.50	2.25 to 2.50	2.35 to 2.60
Fur. coke.	2.10 to 2.25	2.10 to 2.25	2.25 to 2.50

Old Material.—The market is not particularly active in scrap iron. Dealers are firm holders of the stock on hand, and the amount of business going in the way of picking up and turning over scrap is moderate. The market for turnings and borings and machine scrap has not reached a point where it is profitable to dealers who have been taking it in on contracts with shops to sell it. Present selling prices are represented in the following table, but some stocks are held above these figures:

Old No. 1 R. R. wrought net tons	$14.50 to 15.00
No. 1 machinery, net tons	13.50 to 14.00
Old iron rails, gross tons	15.00 to 16.00
Old steel rails (re-rolling) gross tons	14.00 to 14.50
Old short lengths, gross tons	13.50 to 14.00
Old iron axles, net tons	17.00 to 17.50
Heavy melting scrap, gross tons	14.50 to 15.00
Stove plate, net tons	10.50 to 11.00
Heavy turnings, net	9.50 to 10.00
Cast borings, net tons	8.00 to 8.50
Car wheels	14.50 to 15.50

Iroquois stack B, at South Chicago, was blown in Friday, Sept. 17.

NEW YORK.

Ocean Freights on Ore Higher—Heavy Sales of Pig Iron.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Sept. 21.

Iron Ore.—In addition to transactions previously noted, there have been sales of local and foreign ores aggregating slightly over 200,000 tons. As yet there has been no selling of the 400,000 or 500,000 tons of Swedish ore allotted to this country by the leading producer for 1910, and certain other interests which find their market among eastern furnaces are making no effort to sell for that delivery, preferring to await development. Ocean freights are higher, a rate of 9s 3d prevailing in connection with charters closed the past week for the ore trade from Mediterranean points. Nevertheless, eastern furnacemen realize that they will have to run independently of the lake supply next year, inasmuch as little merchant ore is being stored and that chiefly on western docks. The report has been pretty generally circulated through the east that lake prices next year will be 50 cents higher.

Pig Iron.—Although basic sales have been neither numerous nor large, the volume of business placed during the past week has been extremely heavy, the aggregate tonnage probably exceeding that of any week for a considerable time. Both in this immediate district and in New England, purchases have been made by a wide variety of consumers and for a variety of delivery. The result of this brisk movement has been to bring out scattered advances, which in contrast with the unchanged quotations of certain interests give the market a rather ragged appearance. A few producers which are still asking relatively low prices insist that they will mark up no further advances until they have booked satisfactory tonnages: this policy will tend to keep down prices in eastern Pennsylvania, where a price of $17.50, furnace, is being made by a large merchant interest for delivery into this territory and $17.00 for New England shipment. On the other hand, some furnaces which are well sold up are asking $18.00, furnace, for No. 2X over the remainder of the year and $18.50 for 1910. Considerable additional tonnage will shortly be available. Nittany furnace and one of the Donaghmore stacks will blow in about the middle of October, and Bellefonte and the remaining Donaghmore furnace about a month later. Rockhill furnace will probably not become operative until next year. A leading Alabama producer has just advanced to a $15.00 basis for delivery over either the last quarter or the first quarter and is requiring its representatives to submit all inquiries. On the other hand, there is still spot iron to be had at $14.50 and possibly lower, although this appears to be the minimum. The leading producer is offering no iron prior to the second quarter. A leading Virginia furnace has advanced to a $16.00 basis and has made some good bookings at the new level. The heavy stock accumulated by one producer in this district has been reduced to a considerable extent, practically all the lower grade irons having been disposed of. We note the sale of 1,000 tons of No. 3 foundry and 1,000 tons of gray forge on the level noted above. Buffalo furnaces have taken large orders in the New England territory on a $16.00, furnace, basis for prompt delivery and it seems that the lower prices recently reported in this connection have been eliminated. A sale of 800 tons of coke malleable at $16.50, Buffalo, for the last quarter is a fair indication of that market; for next year the malleable holding price is $17.50, furnace. Charcoal iron is unchanged and we note a sale of 200 tons for the remainder of the year at $19.50, Buffalo. A sale of 500 tons of low phosphorus iron made from central Pennsylvania ores was at $17.00, furnace; the price has been advanced to $18.00. We quote:

Northern foundry No. 1	$18.50 to 19.00
No. 2X foundry	18.00 to 18.50
No. 2 plain	17.50 to 18.00
No. 2 southern foundry	17.75 to 18.25
Malleable	18.00 to 18.50
Gray forge	16.75 to 17.25

Ferro-Alloys.—A very fair volume of business is current in ferro-manganese, one interest reporting scattered sales of about 300 tons for the remainder of the year at $42.50, seaboard, and some 400 tons for the first half at $44.00 to $45.00. Several small sales of ferro-silicon are reported at $62.50, Pittsburg, for early delivery, but the market is weak and this price is procurable for 1910 shipment as well. A considerable call is noted for Bessemer ferro-silicon.

Finished Materials.—The recent placing of several attractive orders in a non-competitive manner, a development of the immediate past, is explained as being due to difficulties in securing satisfactory deliveries in view of the sold-up condition of most interests and not as a fore-runner of a badly needed price improvement.

During the past week, two important contracts have been taken by the Hay Foundry & Iron Works in this manner, a local building for Henry Corn and a building at Fourth avenue and Twenty-fourth street, the steel requirements of which aggregate about 9,000 tons. The Pennsylvania Steel Co. will supply 1,000 tons for a Strauss bascule bridge over the Cape Cod Canal. Other contracts closed in this territory include a mill building at Lawrence, 650 tons, to the Jones & Laughlin Steel Co.; a bridge for the Boston & Maine at Nassau, N. H., 550 tons, to the Boston Bridge Works; and wharf sheds at Mobile, 800 tons, to the Virginia Bridge & Iron Co. Bids have gone in on the following: additions to the Schenectady plant of the General Electric Co., 900 tons; naval hospitals at Chelsea, Newport and Portsmouth, N. H., 400 tons each; bridge work on the Baltimore & Ohio, 1,900 tons; and a viaduct at Richmond, Va., 2,100 tons, which was up about a year ago and is again under negotiation. A baseball grandstand at Chicago will require 1,500 tons. The American Bridge Co. last week booked a total of 5,000 tons and independent interests secured about 13,000 tons.

We note a sale of 500 tons of special billets, taken on the basis of $28.00, mill, for open-hearth. Another producer is selling at $6.00 above the figure current early in the summer, and billets are so scarce that almost any price can be secured for good deliveries. Eastern producers are sold up well into the future.

The New York, Ontario & Western is in the market for 4,000 tons of rails for next year, and the Grand Trunk for 7,500 tons. The Joplin, Neosha & Springfield, a trolley line still being financed, has inquired for 16,000 tons.

Bar iron is firmer and a fair business is being done. The premium for less than carload lots has been restored, the average mill price being 1.45c and 1.50c, respectively. There has been further selling of steel pipe for export, one interest taking about 1,000 tons, and an advance is expected about Oct. 1.

We quote: Angles, 3 to 6 inches x ¼-inch and heavier, 1.61c; beams, 3 to 15 inches, 1.61c; tees, 3 x ¼-inch and heavier, 1.61c; plates, carloads, tank, 1.61c; marine boiler, 1.86c; bar iron, 1.55c to 1.60c; soft steel bars, 1.56c; sheets, No. 28, black, 2.56c.

Cast Iron Pipe.—Better inquiry is noted, particularly in the New England district, for delivery next year. Most producers are higher in their ideas of price, but here and there one which is eager for business is quoting low. The Albany letting, 1,000 tons of 6 to 12-inch, went to Charles Millar & Sons, the Lynchburg Foundry Co. secured six miles of small pipe for Christiansburg, Va., and the leading interest is expected to furnish the pipe, some 3,000 tons, involved in the recent contractors' letting for New York City.

Old Materials.—The local market is featureless and prices show no important changes. There is considerable irregularity on heavy melting steel, sales being made all the way from $17.50 to $18.00, delivered at eastern Pennsylvania mills, the former price ruling on all but large tonnages. British dealers are still offering considerable tonnages and it would not be surprising at any time to learn of the importation of choice lots of crop ends. We quote, gross tons New York delivery, these being the figures which dealers are willing to pay:

Old steel rails (rerolling)	$15.00 to 15.50
Relaying rails	19.00 to 19.50
Old car wheels	14.50 to 15.00
Old iron car axles	22.00 to 23.00
Old steel car axles	20.00 to 20.50
Heavy melting steel	14.50 to 15.00
No. 1 railroad wrought	17.00 to 17.50
Iron track scrap	15.00 to 15.50
Wrought pipe	14.00 to 14.50
Cast borings	9.50 to 10.00
Wrought turnings	11.50 to 12.00
Heavy cast scrap	13.00 to 13.50
Railroad malleable	13.00 to 13.50
Stove plate	11.50 to 12.00
Grate bars	11.00 to 11.50

PHILADELPHIA.

Wide Range on Bids on Isthmian Canal Scrap.

Sept. 21.

Pig Iron.—The market of the past week has shown a steady, featureless continuance of conditions previously reported, with the difference that practically no selling of basic iron has been done in this territory. This lull can hardly be more than temporary, however, as considerable iron will have to be bought by Eastern steel works for the remainder of the year, and only in isolated cases have their probable requirements for the first half been covered. So far as can be learned, the $18.00, delivered price, has not been exceeded, and certain consumers are still unwilling to pay that figure. On the other hand, several producers are holding at 50c or $1.00 higher and any effort to secure even a moderate tonnage of prompt iron may force the price upward. A 12,000-ton inquiry is pending. A healthy volume of foundry business is reported, both for last quarter and first half delivery. On the former $18.00 is the minimum and iron as cheap as this is scarce, while for 1910 quotations range up to above $19.00, delivered, for No. 2X. No big blocks have been sold, but the aggregate of moderate orders has been large. Neither southern nor Virginia iron is coming into this district at present. Low grade irons are inactive because of their scarcity. One sale of 3,000 tons of forge for shipment this year is reported at $17.00, delivered. On a smaller tonnage a price of $17.35 was withdrawn. One large local consumer is reported to have bought heavily of Middlesboro iron, but the report lacks substantiation and quite likely is untrue. Further than this, there are no rumors of importations. Of the 43 stacks controlled by members of the Eastern Pig Iron Association, 33 are now operating, the other ten chiefly being small and badly situated for economical production. Stocks on banks are down to an insignificant figure, while orders-on-books showed a rate of increase for the month heavier than heretofore. We quote, delivery at Eastern Pennsylvania plants during the balance of the year, as follows:

No. 1X foundry	$18.50 to 19.00
No. 2 X foundry	18.00 to 18.50
No. 2 plain	17.50 to 18.00
Standard gray forge	16.75 to 17.25
Basic	18.50 to 19.00
Low phosphorus	20.50 to 21.00
No. 2 Birmingham	18.00 to 18.50
No. 2X Virginia	18.00 to 18.50
No. 2 plain Virginia	17.50 to 18.00

Finished Materials.—The brisk demand for bars, largely for railway requirements, has established all producers firmly on a 1.40c, Pittsburg, basis, and in some cases has filled up mills to such an extent that they are practically out of the market on the smaller sizes. Considerable selling of shapes and plates for railroad work is also noted, and the Norfolk & Western has just entered the market for the requirements of 3,000 cars which will be built at its Roanoke shops. This purchase may run up to 45,000 tons. The requirements for the two Dreadnoughts to be built at local ship yards, have not been placed definitely, although early decisions are expected. Philadelphia will soon be in the market for three school buildings, aggregating 1,500 tons of steel; Richmond, Va., opens bids this week on a court house and post office, involving 1,200 tons; and the building for the Fidelity Casualty Co., of Baltimore, 1,500 tons, promises an early decision. Billets are so scarce that accurate quotations are impossible. On structural shapes mills are securing 1.78c Philadelphia, out of stock, the regular

figure for the remainder of the year being 1.65c on shapes and plates. Steel bars are firm at 1.55c. Shipments range from four to 12 weeks on various products, but no orders into 1910 are being booked. Eastern roads have shown little interest so far in rails for that delivery.

Old Materials.—The market has become well established on an $18.00, delivered, basis for heavy melting steel, that being the price at which the allied interests have secured a large tonnage, though for smaller blocks $17.75 is the usual price. The bids submitted last week for the scrapped machinery at the Isthmus showed a surprising range, from $7.25 up to $18.80. These figures are for net tons, delivered at New York, the government using this material as ballast for return cement ships. The high figure was made by a San Francisco bidder, however. Joseph Josephs & Co., a well known factor in the trade, offered $13.51 and the bids of other leading dealers, such as Jno. Leonard & Co., Flitt & Co. and Frank Samuel, ranged between $10.00 and $10.75. Several partial bids were submitted, but will not be considered; the award will be made at an early date. The material is clean scrap, principally machinery of an obsolete type which will be broken up on the Isthmus, and will total over 100,000 tons in the next three years. All bidders were required to post a certified check for $5,000. We quote, gross tons, Eastern Pennsylvania delivery, as follows:

Old steel rails (rerolling)	$18.75 to 19.25
No. 1 steel scrap	17.75 to 18.25
Old steel axles	23.00 to 24.00
Old iron axles	26.00 to 27.00
Old iron rails	20.00 to 21.00
Old car wheels	17.00 to 17.50
Choice scrap R. R. No. 1 wrought.	20.00 to 20.50
No. 1 yard scrap	18.50 to 19.00
Machinery scrap	16.00 to 16.50
Low phosphorus scrap	20.50 to 21.00
Wrought iron pipe	17.00 to 17.50
No. 1 forge fire scrap	16.00 to 16.50
No. 2 forge fire scrap, ordinary.	9.50 to 10.00
Wrought turnings	14.50 to 15.00
Axle turnings, heavy	15.50 to 16.00
Cast borings	12.50 to 13.00
Stove plate	14.00 to 14.50

BUFFALO.

Lackawanna Steel Co. Contracts for 45,000 Tons of Bessemer Pig Iron.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Sept. 21.

Pig Iron.—Market conditions are strengthening and prices are stiffening. The demand for the foundry grades has increased for prompt shipments, while a lively interest in 1910 iron is developing. Inquiries are now fairly numerous for first quarter iron of the leading foundry grades, consumers asking prices on lots running nearer 5,000 tons than 500. There is no doubt that a stiffer price will be named by the furnaces, but just when this turn will be made is a matter of conjecture. It might occur any day. For this week, however, we alter last week's quotations only slightly, except in Bessemer. Business is reaching the furnaces at this point from distant territory, as it has for several weeks past. Local foundries are a trifle more interested in the market than they were, indicating a slight improvement at the foundries, which were, and still are, somewhat short of business. The Lackawanna Steel Co. has purchased 20,000 tons of Bessemer from one interest and arranged for 25,000 more on a conversion deal. We quote, f. o. b. Buffalo, for prompt delivery, as follows:

No. 1X foundry	$16.50 to 17.00
No. 2X foundry	16.25 to 16.75
No. 2 plain	16.00 to 16.25
No. 3 foundry	15.75 to 16.00
Basic	16.50 to 17.00
Gray forge	15.25 to 15.50
Malleable Bessemer	17.50 to 18.50
Charcoal	19.50 to 20.50

Finished Products.—The demand for finished material is generally confined to contract customers, with only scattering specifications for good tonnage from new prospects. About the only business tangible at this point is the 100 tons for the proposed office and laboratory building of the American Radiator Co., Buffalo, for which bids have just been opened. This contract is now pending.

St. LOUIS.

Pig Iron Market Very Strong, with Upward Tendency of Prices.

Sept. 20.

Pig Iron.—The prevailing price in the St. Louis territory for No. 2 pig iron, Birmingham basis, seems to be $14 to $14.50 for delivery over the remainder of the present year and the first quarter of next year, and from $14.50 to $15, second quarter delivery, with some dealers insisting that $14.50 is the best that can be done for prompt shipment. The market is regarded as decidedly strong, and several furnaces wired their representatives today to withdraw all prices. Northern iron is quoted at $17, Ironton, for all deliveries. Virginia quotations are reported to have risen 50 cents a ton today, and to be firm at $15.50 for No. 2 for delivery over the remainder of the year, and $16 for shipment over the first half of 1910. Orders for pig iron, coke and coal are quite numerous, and it is firmly believed that a buying movement has started for all of these commodities. One sale of 6,000 tons of car wheel iron was made last week for delivery over the remainder of the year, and an additional tonnage from the same buyer is pending. Some spot iron was sold in the St. Louis territory last week at $14.50 to $15, Birmingham, and some furnaces are reported to be behind with orders.

Our quotations, delivered, to which the freight of $3.75 from Birmingham has been added, follow, the lower quotation being for prompt and the higher for future delivery:

No. 1 southern	$18.25 to 18.75
No. 2 southern	17.75 to 18.25
No. 3 southern	17.25 to 17.75
No. 4 southern	16.75 to 17.25

Coke.—The demand for 48-hour Connellsville furnace coke is not brisk in the St. Louis territory, but in the Connellsville district $2.75 is said to be asked, while 72-hour foundry grades are quoted at from $2.35 to $2.65, ovens, for prompt delivery. One inquiry is pending in the St. Louis territory for from three to five cars daily of furnace coke, but there does not seem to be any certainty that the business will be placed.

The best grades of Connellsville foundry coke are held at $2.75 to $3 for shipment over the first half of 1910. Virginia and West Virginia 72-hour foundry coke is quoted at $2.25 to $2.50 for delivery over the rest of the year, and at $2.50 to $2.75 for the first half of 1910. Stonega is held at $2.50 for this year's delivery, and at $2.75 for shipment next year, f. o. b. ovens in each instance. Byproduct coke is worth $5.35 delivered.

Old Material.—The market for scrap iron is brightening up, with quotations remaining as follows in the St. Louis territory:

Cast iron borings, free from foreign material, net tons	$ 5.50 to 6.25
Steel axle turnings, gross tons	11.00 to 12.00
Steel railroad axles, net tons	18.00 to 19.00
Iron railroad axles, net tons	20.00 to 21.00
Miscellaneous steel scrap, gross tons	11.00 to 12.00
Old car wheels, gross tons	15.50 to 16.50
No. 1 railroad cast scrap, net tons	12.50 to 13.50
Heavy machinery cast, net tons	14.00 to 14.25
Stove plate and light cast, net tons	10.00 to 11.00
Sheet iron, net tons, uncut	5.00 to 5.50
No. 1 railroad wrought, net tons	13.00 to 13.50
Railroad malleable, net tons	13.00 to 13.50
Heavy melting steel, net tons	12.00 to 13.00
Relaying rails, net tons	18.00 to 19.00
Extra heavy cast, regular breaking	12.00 to 13.00
Railroad grate bars (eng)	10.50 to 11.00

BIRMINGHAM, ALA.

Sellers Disposed to be Conservative—Industries Generally Busy.

Sept. 21.

Southern pig iron manufacturers are hesitating a little in selling their product because of the advancing quotations. No. 2 foundry is being quoted at $14.50 per ton for delivery during the first

quarter of the coming year, with $14 per ton the minimum price. Already there is some talk of $15 per ton iron, and inquiries are coming in right along, delivery being stipulated into the first half of the coming year. The make is being improved. Two furnaces have been blown in this month already, and one or two others will be put into action by the end of the month. In October there will be four furnaces to receive the torch, and still more may be gotten ready. There is confidence that the raw material supplies will keep up with the demands of the furnaces, no matter how many of them are started. There is a better demand for basic iron, while charcoal iron is in good demand also. Some of the larger interests are in the market for iron for future needs, the cast iron pipe interests especially sounding the market. There is a better consumption in the home territory now than there has been for some time. Not only are the cast iron pipe and soil pipe concerns well supplied with business, but the foundries and machine shops and other industries are reporting improvement in conditions. The shipments of pig iron from this territory are increasing. Railroad authorities announce that there is a better demand for cars with which to handle not only the raw material but also the manufactured product. All empty cars on sidings are being moved to the centers in order that every demand for the cars shall be met. The report of the Alabama Car Service Association for the month of August shows an increase of over 10,000 cars handled by the railroads of this state over the number of the same month last year. Inasmuch as the greater number of cars are handled in the industrial regions of Alabama, the improvement in industrial conditions in this section can well be figured on.

We quote old material as follows:

Old iron rails	$16.00 to 16.50
Old iron axles	17.50 to 18.00
Old steel axles	16.50 to 17.00
Old steel rails	11.50 to 12.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	11.50 to 12.00
No. 1 country	8.00 to 8.50
Old standard car wheels	13.00 to 13.50
Stove plate	9.00 to 9.50
Heavy melting steel	11.50 to 12.00
Old steel boiler plate	9.00 to 9.50
No. 1 machinery	11.50 to 12.00
Cast borings	5.50

SEATTLE.

Improvement Comes Slowly—Foreign Iron Shuts Out Domestic Product.

Office of THE IRON TRADE REVIEW,
302 Pioneer Bldg., Sept. 17.

While the improvement of business conditions on the north Pacific coast is conservative, yet there is marked evidence of better times on every hand. A number of local development projects are opening up a livelier demand for machinery, particularly pumps, mine and irrigation supplies. The heavy shipments to northern Alaska have ceased for the season. Logging interests are more active; a prominent Oregon manufacturer of logging engines has more business booked at present than at any time for two years.

Pig Iron.—The consumption is slowly increasing; the prices of domestic iron are going up in sympathy with advancing Birmingham quotations while those on foreign shipments are stationary or sagging. The result is the freezing of domestic iron, except for special purposes, out of the Pacific coast market. Large shipments have recently been received from Alabama but no more are to follow. December iron from Europe is low, some offers of $21.00 ex ship having been made. We quote as follows, foreign iron ex ship Puget Sound or Columbia river, domestic f. o. b. Pacific coast terminals:

English, Cleveland, No. 1, spot	$23.00 to 24.50
English, Cleveland, No. 1, to arrive Sept.	23.50 to 24.00
English, Cleveland No. 1, to arrive Dec.	21.00 to 22.00
English, Cleveland, No. 1, to arrive Feb.-March	21.50 to 22.50
Glengarnock, Scotch, to arrive September	25.00
Southern No. 2, domestic	24.65

Merchant Iron.—An excellent tonnage is moving, although jobbers are not reaching out for business in this department. Shipments of foreign bars, which it is claimed can be landed in Seattle for 1.70c, continue to arrive at intervals. In spite of this disturbing element, which is preventing any raise in prices, there is less shading going on in the trade than for some time past. Bar steel is stiffening and local mill representatives will not quote 2.05c, Seattle, without authority from the east. The market is still attractive from a buyer's standpoint. We quote base prices per 100 pounds, f. o. b. Seattle as follows: Common iron bars, $2.00; soft steel bars, $2.20; machinery steel, $2.75; Norway iron, $3.50; angles, channels, zees and tees, under 3 inches, $2.75.

Sheets.—Extensive purchases are having a steadying effect on prices. In some instances, a 5-cent advance is being quoted. Galvanized sheets are particularly active and purchasers are being advised to contract for as much tonnage as possible. We quote, f. o. b. Seattle as follows: Blue annealed sheets, No. 12, 2.95c; No. 14, 3c; No. 16, 3.10c; Nos. 22 to 24, 3.35c; No. 28, 3.70c. Galvanized sheets, Nos. 10, 12 and 14, 3.55c; No. 16, 3.65c; Nos. 22 to 24, 4.10c; No. 28, 4.70c.

Old Material.—The demand for first class foundry scrap is good and dealers' stocks are fairly heavy. Wrought iron or scrap steel is dull and slow. We continue to quote net tons, f. o. b. Seattle as follows:

Foundry and machinery scrap	$19.00 to 20.00
Old car wheels	16.50 to 17.00
Railroad wrought	10.00 to 11.00
Country wrought and busheling	5.00 to 8.00

BRITISH IRON AND STEEL MARKET.

Pig Iron Quiet, but Prices Firm—American Demand Expected.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, England, Sept. 11.

Pig Iron.—The week has generally been a quiet one in pig iron, both in the Midland and Cleveland districts, but the sole reason seems to be that for the time being consumers have satisfied their requirement. In spite of the comparative quiet, prices everywhere have been well maintained. Today's selling figure for No. 3 Cleveland is 51s 4d ($12.56), substantially the same as a week ago. Circumstances all point to increase. To some extent, the strength of the market is due to speculation, as a great number of outsiders are dabbling in warrants. But there is also a solid demand in spite of the fact that production is heavier than ever. The present amount in store is 296,077 tons, an increase during the month of 7,575 tons. Shipments are increasing, the exports being 23,000 tons. There is every expectation of a trade with America, which was such a marked feature of the last boom. According to latest reports American iron is selling at $18.50 (75s 6d), whereas No. 3 Cleveland can be delivered at Philadelphia and Baltimore at 70s ($17.12), including duty, allowing for a freight of 7s per ton. It is believed that all American business must come to the Tees, as nothing on the Continent can touch these figures. In the Midlands, coke has suddenly become dear, with a rise on the week of 1s 3d per ton, and the markets are very strong. Practically, all the smelters are booked well into the new year. There has been a rise in Lincolnshire pig iron of a few shillings per ton, which has strengthened such competing districts as Northampton and Derbyshire. In the hematite department, there is a steady improvement and producers are now in a fair position as practically all the pig iron is going into direct consumption. East coast qualities are selling at 69s ($16.88) to 70s ($17.12) and West Coast at 59s ($14.44). The rise in hematite has only been about

4s, compared with 5s 6d for standard Cleveland qualities, the simple explanation of which is that the steel trade has not improved proportionately to iron.

Finished Material.—The finished department of the iron and steel trades, while showing decided improvement still fails to run parallel with the pig iron department. The improvement is mainly due to armament orders and improved shipbuilding. The structural section still continues quiet, with almost an absence of new work. Railways are also buying poorly. During the last week, there has not been a single rail order placed of any importance, and only one inquiry reported. Yesterday a meeting was held in Middlesbrough to improve the arrangements for dealing with the unemployed. From the local Guardians, 5,643 persons have received out-relief during the past fortnight, or 1,736 more than last year, and 1,000 children are being charitably provided with meals. In Sheffield, out of 1,108 molders, 216 are unemployed. It must not be understood that things are not decidedly better; but in most departments there is still a great reserve of productive capacity.

The South Yorkshire Bar Association have decided to continue the existing basis of £6 10s per ton, and makers complain of the poverty of specifications. In the Birmingham district, a few works are still working short time, and while sellers are nearer the standard of £6 5s and more are getting it, some houses are unable to resist offers of business as low as £6 to £6 2s 6d. At the same time, there is a marked improvement on the position of a month ago. In particular, the galvanized sheet department is better, with the standard at £11 to £11 2s 6d.

Within the past few days, orders have been given out by the Admiralty, for 20 torpedo boat destroyers, the total value of which will be one and a quarter million. This covers the requirements under this head for the current year.

METAL MARKETS.

ST. LOUIS.

Sept. 20.

Lead and Zinc.—There was a brisk demand for zinc ore in the Missouri-Kansas-Oklahoma district last week, although prices remained the same as during the preceding week, $49 a ton being the high base for 60 per cent zinc blende, with a top price of $52 for 63 per cent grades. A majority of sales of lead ore were made at $56 and $56.50 a ton, but some high grades were disposed of at $57. Buyers were active in all parts of the district, and early in the week there was great demand for certain bins. The buyers made offerings in the West Joplin district early in the week, and during the first few days many lots were sold at $48, the best price offered. Before the week closed, however, offerings were heavier and the price rose at the rate of 50 cents a bid until $49 was reached. Reports were circulated Saturday that even better figures had been obtained for some bins. Although the demand for lead ore has been brisk for some time, the output has been increased to such an extent that a surplus of blende exists in the district, thus refuting the theory advanced by some that the district is not able to meet the demands of smelters. New mines are weekly taking the places of worked out ones, and development work is going on rapidly. Heavy sales of lead were recorded during the last few days of the week.

Calamine is steadily increasing in production, and sold last week on a basis of $25, with choice lots running better than 40 per cent the basis bringing much more.

The spelter market at St Louis stood firm at $5.67½, with pig lead at $4.27½, when the sales closed Saturday.

NEW YORK.

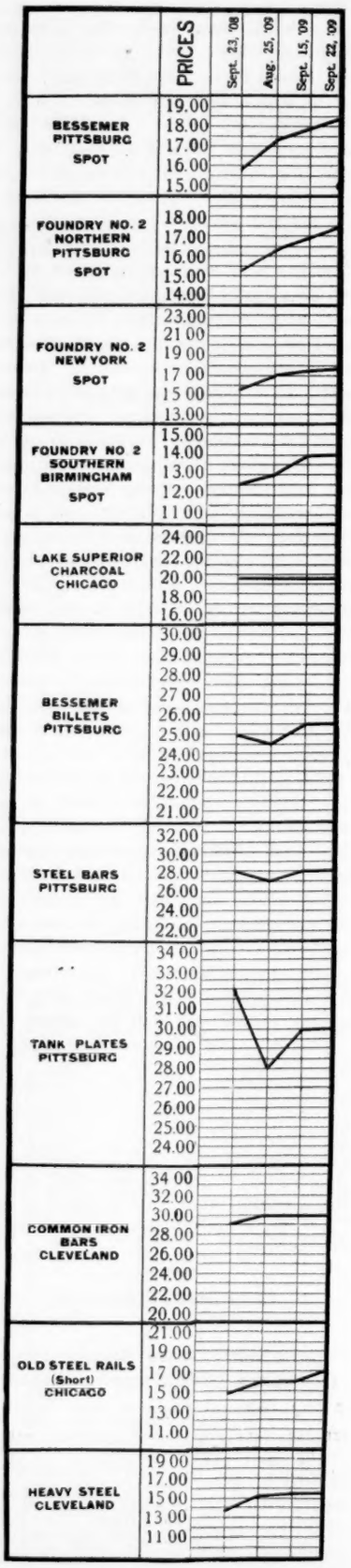
Sept. 21.

Copper.—The market during the past week has been without important features and has remained at about the same level, although the situation is perhaps somewhat weaker. Following the rather unfavorable report of the Copper Producers' Association comes the announcement that exports will not be heavy for the current month and this is affecting the situation to some degree. Current quotations are as follows: Lake, 13¼c to 13½c; electrolytic, 13c to 13¼c; ordinary brands, 12⅝c to 12⅞c. These represent the prices of producers, however, and do not take into consideration considerable resale business which has been current of late.

Pig Tin.—The market doesn't seem to share the improvement noted in practically all its lines of consumption and is still hovering around 30c with the situation decidedly heavy and improvement is anticipated.

Pig Lead.—There is little interest

PRICE CHART.



in the metal, consumers quote aloof from the market to a remarkable degree. We quote: 4.30c to 4.35c, New York.

Spelter.—Current selling is light and consumers are showing little interest in the market. Quotations range from 5.65c to 5.75c, New York.

Antimony.—We quote: Cookson's, 8⅝c to 8¾c; U. S., 8c to 8¼c; outside brands, 7¾c to 8c.

CHICAGO.

Sept. 21.

New Metals.—There is a very fair trade in metals for spot requirements, but not a great deal for future delivery. Purchasers of copper have the option to name delivery as late as December 1, but seem to be a little slow in taking advantage of it. Some well-posted authorities are looking for an advance in the price of copper within a comparatively short time, and they advance the argument that, while stocks made a heavy increase last month, the volume of business is increasingly large, and besides, the stocks are in the hands of strong interests which will not throw them upon the market and cause a break in price. We quote as follows:

Lake copper, carload lots, 13⅝c to 13¾c; casting copper, 13¼c; smaller lots, ¼c to ¾c higher. Spelter, 5.80c to 5.85c; lead, desilverized, 4.40c to 4.45c in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $7.50 list f. o. b. La Salle in car lots of 600-pound casks; pig tin, 31¾c to 32¼c; Cookson's antimony, 10½c; other grades, 9¾c to 10¼c.

Old Metals.—Business is very quiet in this line, and dealers report that quotations are unchanged. We quote dealers' selling prices, as follows:

Copper wire, 13c; heavy copper, 12¾c; light copper, 11¼c; heavy red brass, 11¾c; heavy yellow brass, 9¼c; light brass, 6½c; No. 1 red brass borings, 9¾c; No. 1 yellow brass borings, 7½c; brass clippings, 9¼c; tea lead, 3.60c; lead scrap, 4c; zinc, 4½c; tin pipe, 29c; tin foil, 27c; pewter, 20c; electrotype plates, free from wood, 4¼c; electrotype dross, 2.75c; stereotype plates, 4½c; stereotype dross, 3¼c; prime slab zinc dross, $70 per ton.

During the first half of the current year, Germany imported a total of 3,766,827 metric tons of iron ore, an increase over the corresponding period of the previous year of about 450,000 tons. Ore exports were about one-third of this amount and showed a heavy comparative loss.

CORPORATION PRODUCTION

Compared with That of the Independent Interests.

The following table, compiled by the American Iron and Steel Association, gives the production in 1908 of iron ore, coke, pig iron, steel ingots and castings, finished rolled iron and steel, wire nails, and tinplates and terne plates by the United States Steel Corporation and the independent iron and steel companies; also the shipments of iron ore from the Lake Superior region. The table shows the Corporation produced in 1908 considerably less than one-half of the total production of pig iron and finished rolled iron and steel and over one-half of the total production of steel ingots and castings. All its figures include the production of the Tennessee Coal, Iron & Railroad Co. in 1908.

With the exception of rolled forging blooms and rolled forging billets all unfinished and intermediate rolled products, such as billets, blooms, slabs, sheet bars, tinplate bars, muck bars, etc., are not included in the table. Nor do the figures include hammered, car, locomotive, or other axles, anchors, shafting, hammered or pressed armor plate, and other hammered or forged products.

Iron ore shipments from Lake Superior and the total iron ore production in 1908; also coke production in the same year.	By U. S. Steel Corporation.	By independent companies.	Total shipments and production.	Percentage U. S. Steel Corporation.
Shipments of iron ore from the Lake Superior region...gross tons.	14,579,613	11,435,374	26,014,987	56.0
Total production of iron ore in 1908.....gross tons.	16,662,715	19,320,621	35,983,336	46.3
Production of coke in 1908.....net tons.	8,169,931	17,863,587	26,033,518	31.3
Iron and steel actually produced in the calendar year 1908. Gross tons.	**Production U. S. Steel Corporation.**	**Production independent companies.**	**Total production. Gross tons.**	**Percentage U. S. Steel Corporation.**
Spiegeleisen and ferro-manganese	115,344	36,674	152,018	75.8
Bessemer, basic, low-phosphorus, foundry, forge, ferro-silicon, etc	6,819,064	8,964,936	15,784,000	43.2
Total pig iron, including spiegel., ferro-mang., ferro-silicon, etc	6,934,408	9,001,610	15,936,018	43.5
Bessemer steel ingots and castings	4,055,275	2,061,480	6,116,755	66.2
Open-hearth steel ingots and castings	3,783,438	4,053,291	7,836,729	48.2
Total Bessemer and open-hearth steel ingots and castings	7,838,713	6,114,771	13,953,484	56.1
Bessemer steel rails	795,713	558,523	1,354,236	58.7
Open-hearth steel rails	260,580	306,724	567,304	45.9
Structural shapes	510,343	572,838	1,083,181	47.1
Plates and sheets, including black plates for tinning	1,377,089	1,272,604	2,649,693	51.9
Wire rods	1,234,220	582,729	1,816,949	67.9
Bars, skelp, nail plate, iron rails, and other finished rolled products	1,394,179	2,963,247	4,357,426	31.9
Total finished rolled, including rolled forging blooms and billets	5,572,124	6,256,665	11,828,789	47.1
Wire nails.....kegs of 100 pounds.	6,529,718	4,133,254	10,662,972	61.2
Tinplates and terne plates.....gross tons.	386,718	150,369	537,087	72.0

The following table shows the production of the Corporation and independent companies expressed in percentages,

	Corporation. 1907.	1908.	Independents. 1907.	1908.
Iron ore	43.3	46.3	56.7	53.7
Coke	30.3	31.3	69.7	68.7
Pig iron, including spiegel, ferro-manganese, ferro-silicon, etc	41.9	43.5	58.1	56.5
Bessemer and open-hearth steel ingots and castings	56.4	56 1	43 6	43.9
Finished rolled, including rolled forging blooms and billets	47.5	47.1	52.5	52.9

SWEDISH EXPORTERS.

(Continued from first page.)

next year a geological congress mainly to obtain a fair estimate of the iron supply of the world. Sweden has lately felt secure, as her deposits in the north are very large and are now being worked by modern methods. There are reports of large finds in Ouenza, in Algiers, and already the Krupp, Gelsenkirch, and other large firms have formed a company to work them. Germany has been the main customer of Sweden's iron ore, but the news of the reduction of the American duty on the crude ore has made the Swedish iron ore exporters look for a market in the United States, and already some 200,000 tons are on the way to Philadelphia.

"The Swedish iron exporters are jubilant at the prospect of lower duties on the raw product in the United States.

Owing to increase of business it has become necessary for the Remington Typewriter Co. to enlarge the capacity of its factory at Ilion, N. Y., and orders are to be placed for an additional power unit and for machine tool equipment amounting to about $50,000.

The Monroe Machinery Co. was recently incorporated in Monroe, Mich., for the manufacture of glue room machinery and for power and hydraulic presses. A building for the manufacture of presses is to be erected. The company is in the market for round and channel iron and for foundry equipment. Should the company be able to buy second hand foundry equipment anywhere, it would be willing to do so.

ONLY ONE STACK

Of Carnegie Steel Co. Idle—Great Activity in South.

(Special Telegram.)

New York, Sept. 22.—The Corporation is running slightly over 95 per cent and has ordered in the Steubenville and Zanesville stacks, leaving only one Carnegie furnace idle, a Carrie stack undergoing repairs. Operations in the south are at maximum; the usual ore shortage incident to full operations having been avoided by running two mines practically full while the furnaces were idle, thus accumulating a surplus of nearly 1,000,000 tons.

The Illinois Steel Co. reports scattered sales of 10,000 tons of rails, chiefly for next year. The Ensley rail mill is operating double turn.

IRON ORE PRODUCTION IN 1908 SMALLEST SINCE 1904.

The statistics of the iron ore production for 1908 have just been published by the United States geological survey. The total output was 35,983,336 gross tons, compared with 51,720,619 tons in 1907. This was a decrease of 15,737,283 gross tons, or 30.4 per cent, and was the smallest tonnage output since 1904, when 27,644,330 gross tons were produced. For a series of years the following total output figures are given:

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1870.	3 031,891	1895.	15,957,614	1902.	35 554,135
1880.	7,120,362	1896.	16,006,449	1903.	35,019,308
1889.	14 518,041	1897.	17,518,046	1904.	27,644,330
1890.	16,036 043	1898.	19,433,716	1905.	42,526,133
1891.	14 591,178	1899.	24,683,173	1906.	47,749,728
1892.	16,296,666	1900.	27,553,161	1907.	51.720,619
1893.	11.587 629	1901.	28,887,479	1908.	35,983,336
1894.	11,879,679				

The ore mined in 1908 was valued at $81,845,904, compared with $131,996,147 in 1907, $100,597,106 in 1906, and $75,165,604 in 1905. A comparison is given as follows of the production by states and valuation of the ore mined in 1908 and 1907:

States.	1907. Production.	1907. Value.	1908. Production.	1908. Value.
Gross tons.				
Minnesota	28,969,658	$76,668,836	18,652.229	$42 313,974
Michigan	11,830 342	36,441 330	8,839 199	25,150 861
Alabama	4,039,453	4,863,129	3,734,438	4,358.902
New York	1,375,020	2,820,135	697,473	2,098 247
Wisconsin	838,744	2 665,737	733,993	2,027 208
Pennsylvania	837,287	1,298,717	443,161	572,346
Colorado, Montana, Nevada, New Mexico, Utah, Wyoming, California and Washington	831 258	988,275	528,635	727.192
Tennessee	813 690	1,325,134	635,343	876 007
Virginia	786,856	1 538,920	692,223	1,465,691
New Jersey	549,760	1,815,586	394,767	1,162,474
Georgia	414,114	837,102	321 060	540 189
Texas and Arkansas	118,667	120,060	55,966	30 663
Missouri and Iowa	111,768	226,286	98,414	218,182
West Virginia, Kentucky and Maryland	62,808	95.891	53,235	84,898
North Carolina	50,439	113,488	48,522	76 877
Connecticut and Massachusetts	37 166	136,440	28,112	105 457
Ohio	23,589	41,081	26,585	36,736
Total	51,720,619	$131,996,147	35,983,336	$81,983 336

NEW RECORD PROBABLE IN SHIPMENT OF IRON ORE.

It seems to be now certain that there will be an increase in ore shipments over the season of 1907. The figures for Duluth show a comfortable increase over the record movement, notwithstanding the delays caused by storms. Shipments over the Duluth, Missabe & Northern docks up to Saturday last were 9,073,895 tons as compared with 8,571,441 tons in 1907. The other ports are also moving vast quantities of ore.

The feature of the trade is the movement of grain, which is very heavy, and for which there is lively bidding. Vessel owners are profiting by getting good prices. The coal movement is only fair, boats being more plentiful than cargoes.

LOWEST BIDDER AGAIN.

Pittsburg, Sept. 22.—For the second time, the Pittsburg Valve Foundry & Construction Co., Pittsburg, is the lowest bidder on the valves for the high pressure water system to be installed by the city of San Francisco. On the first bidding the company's offer was thrown out on account of a technicality.

Will Soon Be Operated.—Work has been inaugurated upon the rehabilitation of the old plant of the Waynesburg Forge, Sheet & Tin Mills, Waynesburg, Pa., which was recently purchased at receiver's sale by local capitalists and it is expected that the works will soon be in shape for operation. The new owners have organized by electing I. N. Kuhn, president; R. L. Hoskinson, vice president; Ellis B. Bailey, secretary, and R. R. Hardesty, treasurer. H. Osterberg will be general manager and H. Scanlon superintendent. The directors are I. N. Kuhn, R. R. Hardesty, Ellis B. Bailey, R. L. Hoskinson, Harvey Gall, David R. Huss, James B. Huss, R. E. Kent, H. Osterberg and H. Scanlon. The company is capitalized at $120,000.

BASIC ACTIVE

And Prices Higher—British Iron and German Scrap Coming.

(Special Telegram.)

New York, Sept. 22.—A development of the eastern basic situation is that inquiry is drifting into the whole of next year. A round tonnage is under negotiation for this period and some sales may be concluded today. The demand for basic for the remainder of the year is more acute. Some selling has been done at within 5 cents of the $19 level and interests in this district have disposed of large lots at well above the $18 price heretofore prevailing. Foundry and forge sales made yesterday were extremely heavy and several additional inquiries are near closing.

A cargo of German scrap is under way and a moderate tonnage of British pig iron will shortly be started for Boston.

One thousand tons of Bethlehem sections will be employed in a building for Geo. T. Johnson, 113th street and Broadway, the contract for which has been taken by the Hinkle Iron Works.

RETURNED TO WORK,

With the exception of a few dissatisfied men among the foreign element, all the employes of the Pressed Steel Car Co., marching four abreast behind a huge American flag, returned to work at 6:30 o'clock, Sept. 17. Foreigners had previously announced that they would prevent this movement on the part of the American workmen, but when they saw the show of force made, they fell in at the rear of the column, thus settling the second strike at the McKees Rocks plant. Some Croatians, Russians and Poles did not return. The former chairman of the strikers' executive committee will assist the company in weeding out disturbers among the foreigners.

A split in the ranks of the striking workmen at the McKees Rocks plant occurred Sept. 16. After working exactly a week after the settlement of the nine weeks' strike at the plant, the workmen quit again on Sept. 15, claiming that the company had not complied with promises involved in the former settlement.

B. H. Cooley, of Campbellsport, Wis., has invented a new steel guide post for highways. Patents have been applied for. A factory will be opened at Campbellsport. Mr. Cooley will be in the market for 2-inch cast iron pipe. Gehl Bros., of West Bend, will furnish cast iron caps of special design.

OUR FOREIGN COMMERCE.

July Exports Show Decrease from June, but Compare Well with Last Year—Imports Increased by One-Half.

The total tonnage of iron and steel exports in July showed a decline of about 14,000 gross tons, or 12 per cent. The principal changes are shown in the following table, which enumerates the items in which important changes occurred:

	June.	July.	Change.
Scrap	7,837	2,570	5,267
Billets, sheet bars, etc.	10,574	13,971	3,397
Rails	20,813	18,973	1,840
Sheets and plates	16 102	12,027	4 075
Wire	16,745	14,203	2,542

July furnished the first backset of the year in exports, each month after January having shown an increase. Barring April, May and June, the July exports were the largest since November, 1907, so that on the whole they may be considered very satisfactory. Naturally the total for the seven months ending in July greatly exceeded the total for the corresponding period ending July, 1908, the excess being more than 100,000 tons. The monthly movement of tonnage exports since the beginning of 1907 is shown in the following table:

TOTAL IRON AND STEEL EXPORTS, GROSS TONS.

	1907.	1908.	1909.
January	102 630	74,353	70,089
February	64 728	81,773	84,860
March	112,787	95,681	94 522
April	132,792	93 285	100 903
May	91,543	64,020	109,977
June	92,996	69,779	114,721
July	122,249	86,806	100,670
August	118,792	87 244	.....
September	114,819	76,727	.....
October	123,170	85,668	.....
November	116,308	71,028	.....
December	86,019	77,656	.....
Total	1 301,979	964,236	675,590

Value of All Exports.

The total value of all exports, the tonnage lines including less than half the total and the balance being made up of machinery, hardware, cutlery, etc., varied little in 1908 and thus far this year, being considerably below the average either in 1906 or 1907. The monthly average value of all iron and steel exports (not including agricultural machinery) in the past three calendar years, together with the values in the first seven months of this year, have been as follows:

MONTHLY AVERAGE.

1906	$14,377 782
1907	16,422,232
1908	12,592,760

MONTHS, 1909.

January	$10 329,388
February	10,847,159
March	13,874,461
April	13,058,054
May	12 993,197
June	13,779,736
July	11 856,772
Seven months	$86,819,465

The monthly average in the first seven months of this year was $12,402,781, a trifle more than 1 per cent less than the monthly average in 1908, while July just past fell about 4 per cent below the average of the preceding six months.

Imports Increased.

From June to July there was an increase of almost 50 per cent in our tonnage imports of iron and steel, but the increase nevertheless fell a trifle short of 10,000 gross tons. The items showing the principal increases were as follows:

	June.	July.	Increase.
Pig Iron	10 623	17,899	7,276
Billets, etc.	1,103	2,712	609
Structural	91	959	868
Bar iron	818	1,418	600

The increase in what is designated "pig iron" in the government summary is no doubt in ferro-manganese and spiegeleisen, due to the increased rate of steel production. Our imports of the manganese metals and of ferro-silicon and special grades of pig iron, in periods of normal activity, exceed the total shown in July. It is probable that on account of the reduction in duty some imports were held back and that August will show still larger imports of the so-called "pig iron." No import movement of ordinary pig iron has yet commenced.

INDIANAPOLIS ADOPTS AN OPEN SHOP RULE.

Indianapolis, Ind., Sept. 20.—The municipal authorities, Sept. 16 adopted an open shop rule in the construction work of the city hall building. After attempting to employ union labor exclusively for some weeks, the officials found they could not get satisfactory results because of differences that have arisen between the Building Trades Council and Fertig & Kevers, sub contractors for the painting. Fertig & Kevers agreed to use union painters on the building but the union refused to furnish the men unless the firm would unionize its shop throughout. This was refused and the Building Trades Council ordered all stone, structural steel and other workmen off the building. The structural steel is being furnished by the Noelke-Richards Iron Works but is being erected by G. Ittenbach & Co. Today union brick layers, but non-union men in other lines, resumed work on the building.

The Indianapolis *News* has let the contract for its new 10-story building to the Bedford Stone Construction Co. of this city and work is to start immediately. Structural steel will be furnshed by the Brown-Ketcham Iron Works of this city and all other contracts have been let to local firms

SHEET PRICES

Are Advanced—Nominal Lists Disappear—Pig Iron Feverish.

Pittsburg, Sept. 22.—The sheet market has scored a general advance in prices during the past few days. The American Sheet & Tin Plate Co. announces an advance of $1 a ton on blue annealed sheets, while the independents have also increased their selling scales $1 a ton on black and $2 a ton on the galvanized product, and the market is no longer characterized by nominal lists which have been shaded at will. There is still some discrepancy between the quotations of the leading interest and of the independents, as on some grades prices are higher and on others are lower, and there is little uniformity in the two scales. The new scale of the leading maker on blue annealed sheets is as follows: Nos. 3 to 8, 1.65c; Nos. 9 and 10, 1.70c; Nos. 11 and 12, 1.75c; Nos. 13 and 14, 1.80c; Nos. 15 and 16, 1.90c. The present schedule of the independent companies for box annealed and galvanized is as follows: Nos. 15 and 16, 2c; Nos. 17 to 21, 2.05c; Nos. 22 to 24, 2.10c; Nos. 25 and 26, 2.15c; No. 27, 2.25c; No. 28, 2.30c; No. 30, 2.40c. Galvanized, Nos. 12 to 14, 2.35c; Nos. 15 and 16, 2.45c; Nos. 17 to 21, 2.55c; Nos. 22 to 24, 2.70c; Nos. 25 and 26, 2.90c; No. 27, 3.10c; No. 28, 3.25c; No. 29, 3.35c; No. 30, 3.60c.

The pig iron market remains extremely feverish and a heavy business is being transacted. A large local plumbing interest has purchased approximately 10,000 tons of foundry iron, about equally divided between northern and southern grades, for its plants in different sections. Some of the deliveries are for this year and some for first half, and the prices reported are $14.50, Birmingham, for the southern, and $16.50 to $17, valley, for the northern. The Pittsburg Ingot Mold Co. has purchased 3,000 tons of Bessemer for first half at $18, valley. The various Westinghouse interests, which are now in the market for different grades, are expected to close for about 10,000 tons.

The Baldwin Locomotive Co. has added 1,000 employes to its working list the past week, thus having 8,000 men at work on 10-hour day.

A TRIP ON THE CUYAHOGA.

Cuyahoga is an Indian name meaning crooked, and the fact that the Cuyahoga river in the city of Cleveland is so crooked has greatly interfered with the development for manufacturing purposes of the territory through which it runs. During the past few years, a large amount of dredging has been done on the river, and on Wednesday of last week about 500 members of the Cleveland Chamber of Commerce started to make the trip from the Main street bridge to the plant of the Cleveland Furnace Co. The members started on the freighter William Edenborn, loaded with 8,000 tons of ore, but owing to the many windings of the river and the congestion due to the presence of many other vessels, the Edenborn, which started at 12:53, did not arrive at the plant of the American Steel & Wire Co. until 4:25, although the distance in a straight line was only about a mile and a half. The members were surprised to see the developments along the upper part of the river, where a channel 200 feet wide has been created, enabling the Cleveland Furnace Co. to receive its ore direct, but owing to the lateness of the hour, the trip was not continued to the plant of the company. It was expected that the members of the Chamber of Commerce would witness the blowing in of the new stack of the Cleveland Furnace Co., but that event did not take place until Friday evening.

PERSONAL.

Judge Gary returned from Europe, Sept. 21.

F. B. Richards, of M. A. Hanna & Co., Cleveland, has returned from Europe.

Therin I. Crane, of Pilling & Crane, Philadelphia, has returned from a three months' stay in Europe.

Birmingham University, Birmingham, England, will confer the degree of LL. D. upon Andrew Carnegie, Oct. 20.

Leigh Best, first vice president of the American Locomotive Co., has returned to New York from a vacation spent in the Adirondacks.

William P. Harper, purchasing agent for Allis-Chalmers Co., Milwaukee, Wis., has gone to the Pacific coast for a three weeks' vacation.

John W. Pickering, of Sota & Eznar, London, sailed Wednesday after a month in this country. V de Ysasi, representing the firm in its Philadelphia office, has returned to London.

Prof. Arthur Richter, of the engineering college of the University of Wisconsin, has been appointed dean of the college of engineering of the University of Montana, Helena.

Wm. H. Tolman, director of the Museum of Safety and Sanitation, has returned from an extended European trip. He will devote the winter to lecturing in various parts of the country under the auspices of the museum.

James C. Howell, of New York, general contractor and builder, has been appointed assistant manager of the Warner Instrument Co., of Beloit, Wis., manufacturer of automobile speed registers, railroad appliances, etc., to succeed Alfred S. Koto.

Ferdinand Schlesinger, president of the Milwaukee Coke & Gas Co. (Solvay) and the Northwestern Iron Co., Milwaukee, has returned from a year's sojourn in foreign lands. Mr. Schlesinger is much improved in health and will again be active in the affairs of the two large corporations.

J. H. P. Wharton, formerly of the sales department of La Belle Iron Works, Steubenville, O., has been made assistant manager of sales of the Republic Iron & Steel Co., with headquarters at Pittsburg, and will devote his attention exclusively to the handling of the tubular products of which the company will soon be a maker.

A. J. Love has been appointed representative for three affiliated interests of Aurora, Ill., with offices at 906 Fisher building, Chicago. The companies mentioned are: Love Brothers, Inc., structural and ornamental iron work; Aurora Foundry Co., brass and iron castings; and the Fox River Iron Co., railroad castings and brake shoes, and heavy gray and white iron castings.

Charles F. Long, for a considerable time chemist for the Globe Iron Co., Jackson, O., is a member of the firm of Burgess, Kimberly & Long, recently organized with offices in the Columbus Savings & Trust Building, Columbus, O., to engage in consulting, sanitary and chemical engineering. A laboratory is maintained and particular attention will be devoted to analyses of minerals, metallurgical materials, flux-stones and fuels, as well as to the disposal of manufactured wastes and the recovery and utilization of by-products.

OBITUARY.

Julian King, of Grand Rapids, Wis., founder of the Grand Rapids Foundry Co., and its president until a few years ago, died at Grand Rapids after a prolonged illness, aged 79.

Wm. Moran, one of the founders of the ship building and engineering firm of Moran Bros. Co., now known as The Moran Co., Seattle, died Sept. 13 at his home, Rosario, Wash. Mr. Moran came to Seattle in the eighties and with his brothers, all of whom were expert machinists, established a small machine shop and foundry, which gradually grew until now the works of The Moran Co. are among the largest in the west. When he retired from business a number of years ago, Mr. Moran was vice president of the company.

Alexander McVittie, president of the Toledo Ship Building Co., Toledo, died at his summer home at Harbor Beach, Mich., on Sept. 15, of heart failure. He was born in Scotland, but went to Montreal as a very young man. Later he settled in Detroit and identified himself with the ship building industry of that city. In his connection of 40 years or more with the ship building of that city, he advanced from a clerical position to that of president of the Detroit Ship Building Co. Three years ago, the Craig yard at Toledo was purchased through interests associated with him and the Toledo Ship Building Co. was formed, of which he was made president. He retired from active work only a few days before his death. He was 67 years old.

James J. Hagerman, founder and president of the Milwaukee Iron Co. until its absorption by the Illinois Steel Co., and the consequent designation as the Bay View works of this corporation, died at Milan, Italy, on Sept. 14, at the age of 72 years. Mr. Hagerman came to Milwaukee in 1865. In 1882 he was taken ill and went to Colorado Springs for his health. Here he developed the Mollie Gibson mine, an extensive silver property, which became famous as a producer. He built the Colorado Midland Railway. In 1895 he moved to New Mexico, where he built the Texas Valley railroad and the Pecos Irrigation Co.'s great canal. He went abroad with Mrs. Hagerman in July, 1908, and expected to return to America on Sept. 26. One son, Herbert, is a former governor of New Mexico.

The recent annual report of La Belle Iron Works shows comparative profits for five years ending June 30 as follows: In 1905, $1,186,417.24; in 1906, $1,853,079.86; in 1907, $2,457,146.97; in 1908, $1,755,639.16, and in 1909, $1,814,393.73. The company's ore production from La Belle mine was 32,207 tons and from the Miller mine 227,205 tons, a total of 259,412 tons.

Stocks Take an Upward Turn

A vigorous upward trend in prices marked last week in the stock market. United States Steel common and Reading reached the highest prices they have ever commanded, and rates for both call and time money advanced.

Monday the market opened weak, the bulk of the business being in Reading and Union Pacific and United States Steel. Robert S. Lovett was elected chairman of the Union Pacific board, and Jacob H. Schiff and William Rockefeller members of the board. Money and grain were firm Tuesday, call money advanced to 3 per cent, the highest point for the last six months. The stock market was active and strong. Westinghouse Air Brake, on account of the extra dividend, advanced to 125. Tuesday the New York market was strong and higher. The hardening money market failed to check the activity in trading. Westinghouse Air Brake and Crucible Steel advanced to new high records on the Pittsburg market. Thursday, United States Steel reached 84½, and sales of that stock numbered 252,000 shares. Friday, sales on the New York market reached 1,131,000 shares. Reading made a new high record and St. Paul advanced to the highest price since 1906. The market was somewhat irregular, and call loans continued 2¾ to 3 per cent. La Belle iron sold at 150, the highest price of the year. Saturday the market was moderately active and prices irregular.

Money on call throughout the week was nominally 3 per cent. The low level of the week was 2¼ per cent. Time money was firm throughout the week, with the highest rates ruling at the close. Total bank clearings in the United States were estimated at $3,292,700,723, an increase of 28 per cent over the preceding week and 20½ per cent over the corresponding week last year. The actual report of clearing house banks showed surplus increased $8,955,950; deposits decreased $28,605,800; loans decreased $30,625,400 and the ratio of reserve, 25.9 per cent, against 25.3 per cent the week before. Trust companies and non-member banks showed loans increased $5,242,500; deposits decreased $13,461,700, and the percentage of reserve 17.8, against 17.3 the week before. Gold exports for the month of August were $9,228,534; imports $5,348,757, leaving the excess of exports, $3,879,777, against an excess of $13,391,896 in July and $2,295,895 in August, 1908. Gold exports for the week from New York were reported as $25,256, against imports amounting to $75,368. Commercial failures numbered 213, against 204 the week before, and 246 the corresponding week last year. The liabilities and failures up to Sept. 18, amounted to $4,396,170, against $5,072,418 the same period last year. The number of shares dealt in in the New York exchange during the week was 5,402,700, against 4,610,942 the week before and 4,663,400 the corresponding week last year. Bonds, other than government bonds, were sold to the amount of $21,262,000, against $17,552,000 the week before, and $15,709,000 the corresponding week last year.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo- Sept 18	Changes in week	Date Ann.	1909 M't'g.	Stock Outstanding	Dividend Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	15¾	+ ⅜	Sept.	2	$19,820,000		2½ Q.	
Allis-Chalmers, pr	54	+2⅛			16,150,000	7 cum		Feb., 1904
American Can	12¼	— ¼	Feb.	2	41,233,300		1¾ Q.	
American Can, pr	82	— ¼			41,233,300	7 cum		Oct., 1909
Am. Car & Foundry	70	+3	June	24	30,000,000		1¾ Q.	Oct., 1909
Am. Car & Fdy., pr	118	+ ¾			30,000,000	7 n. c.	½ Q.	Oct., 1909
American Loc	61	+2¼	Oct.	19	25,000,000	5	1¾ Q.	Aug., 1908
American Loc, pr	117	+2⅜			25,000,000	7 cum	1¾ Q.	Oct., 1909
American Ship	64	.....	Oct.	13	7,600,000	4	1¾ Q.	Sept., 1909
American Ship, pr	110	.....			7,900,000	7 cum	1 Q.	Oct., 1908
Am. Steel Foundries(new)	61¼	+3½	Dec.	2	17,184,000		1¾ Q.	
Barney & Smith	30	.....	June	1	2,000,000	4	.....	Sept., 1907
Barney & Smith, pr	100	.....			2,500,000	8 cum	1 Q.	June, 1908
Bethlehem Steel	35¼	+1¼	April	6	14,862,000		2 Q.	
Bethlehem Steel, pr	67	.....			14,908 000	7 n. c.	.....	Feb., 1907
Cambria Steel	45½	+1½	March	16	45,000,000*	3	¾ Q.	Aug., 1909
Cambria Iron	46¾	.....			8,468,000*	4	1½ S. A.	Sept., 1909
Chicago Pneumatic Tool	32¾	— ¼	Feb.	15	6,145,800	4	2 S. A.	Oct., 1907
Colorado Fuel	45⅝	+2⅜	Oct.	18	34,235,500		1 Q.	April, 1902
Crucible Steel	133¾	— ¼	Oct.	20	24,578,400		3½	
Crucible Steel, pr	83¼	+1¾			24,436,000	7 cum	1½ Q.	Sept., 1909
Empire Steel	10	.....	April	27	1,254,770		1 Q.	
Empire Steel, pr	70	.....			2,500,000	6 cum	.....	July, 1909
Fay & Egan	90	.....	Feb.	18	1,000,000	7	3 S. A.	Nov., 1908
Fay & Egan, pr	110	.....			1,000,000	7 cum	1¾ Q.	Aug., 1909
General Electric	168	+2½	May	11	65,178,800	8	1½ Q.	Oct., 1909
Harbison-Walker	29½	.....	Jan.	18	18,000,000		2 Q.	Oct., 1907
Harbison-Walker, pr	95	.....			9,690,000	6 cum	½	April, 1909
International Pump	48¾	— ¼	June	8	17,762,500		1½ Q.	April, 1905
International Pump, pr	91¼	+2⅜			11,350,000	6 cum	1	Aug., 1909
Lackawanna Steel	56½	.....	March	10	34,971,400		1½ Q.	
Lake Sup. Corp	27	— ¾	Oct.	6	40,000,000		.....	
New York Air Brake	92	+4½	June	17	8,012,500	8	.....	Oct., 1907
Niles-Bement-Pond	100	.....	Feb.	3	8,500,000	3	2 Q.	Sept., 1909
Niles-Bement-Pond, pr	100	.....			2,000,000	6 cum	1½ Q.	Aug., 1909
Otis Elevator Co.	59	.....	March	15	6,375,300		1½ Q.	Oct., 1909
Otis Elevator Co., pr	99	—1			6,295,000	3 n. c.	1½ S. A.	Oct., 1909
Pa. Steel	68	.....	May	10	10,750,000		1½ Q.	
Pa. Steel pr	116	.....			16,500,000	7 n. c.	.....	May, 1909
Pittsburg Coal Co	22⅛	— ⅜	March	9	28,104,600		3½ S. A.	
Pittsburg Coal Co., pr	60⅝	— ⅞			27,071,800	7 n. c.	.....	April, 1905
Pressed Steel Car	50¼	+ ¾	Feb.	17	12,500,000		1¾	Aug., 1904
Pressed Steel Car, pr	107½	.....			12,500,000	7 n. c.	3	Aug., 1909
Pullman	194	+1	Nov.	10	100,000,000	8	1¾ Q.	Aug., 1909
Railway Stl. Spring	50	+ ⅛	March	4	13,500,000	2	2 Q.	Oct., 1908
Railway Stl. Spring pr	105½	.....			13,500,000	7 cum	1 S. A.	July, 1909
Rep. Iron & Steel	42	+3¾	Oct.	20	27,191,000		.....	
Rep. Iron & Steel, pr	107	+ ⅛			20,416,900	7 cum	2½ Q.†	Oct., 1909
Sloss-Sheffield	89½	+4½	March	10	10,000,000	5	2 Q.†	Sept., 1909
Sloss-Sheffield, pr	119	— ¾			6,700,000	7 n. c.	1¾ Q.	Oct., 1909
U. S. Pipe & Fdy	33⅞	+2¾	June	23	12,500,000	2	1¾ Q.	Dec., 1907
U. S. Pipe & Fdy. pr	85½	+1½			12,500,000	7 n. c.	½ Q.	Sept., 1908
U. S. Steel	83⅜	+4⅜	April	19	508,302,500	3 n. c.	1¾ Q.	Sept., 1909
U. S. Steel, pr	127¼	+1⅜			360,281,100	7 cum	¾ Q.	Aug., 1909
U. S. Steel, 5s	114¾	.....			463,798,000	5	1¾ Q.	
Va. Iron, Coal & Coke	74½	+6½	Sept.	21	9,073,680		5 A.	
Westinghouse Elec	87	+2	June	16	27,173,200	10	.....	Oct., 1907
Westinghouse Air Brake	131	+11½	Oct.	5	14,000,000*		2½ Q.	Oct., 1909

Par value of shares. $100, except those starred (*), $50.
†Includes deferred dividend of ¾ of 1 percent.

Copper Stocks.

New York.—Amalgamated copper closed 87⅞, an increase of 5⅞.

Boston.—Butte coalition closed 25¾, an increase of ¾. Calumet & Arizona closed 105, a decrease of ¼; Calumet & Hecla closed 670, a decrease of 5; North Butte Mining closed 58¾, an increase of 1½; Quincy Mining closed 91, unchanged.

Financial Notes.

The Otis Elevator Co. has declared the regular quarterly dividend of 1½ per cent, on preferred stock, payable Oct. 1.

The Crucible Steel Co. has declared a quarterly dividend of 1½ per cent, payable Sept. 30. The previous dividend was 1¼ per cent, payable June 30.

THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

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THE AVERAGE PAID CIRCULATION OF THE IRON TRADE REVIEW FOR THE ISSUES OF THE FOLLOWING MONTHS WAS:

January	5,506
February	5,346
March	5,396
April	5,508
May	5,533
June	5,551
July	5,572
August	5,597

September 23, 1909.

CHINA'S POSITION IN IRON AND STEEL.

The prospects of China becoming an important iron and steel producer have been steadily assuming definite shape. Geological and social conditions are such as to promise that within the measureably near future China will show a development in iron and steel production which will make an important change in the alignment of the world's industry.

It has been well known for a long time that China possesses enormous resources in iron ore and coal, but the country has seemed so far from being in condition to develop its resources that less than the deserved amount of attention has been paid to what nature has done for it.

Imagine a river connecting our Lake Superior ore deposits with Pittsburg, a river navigable to tow boats and barges, another similar river suited for bringing down coal and coke, and a river navigable to ocean-going vessels connecting Pittsburg with tidewater, and one has a rough sketch of the position in China. The Hanyang iron and steel works are 600 miles inland, on the Yangtse-Kiang river, navigable to large ocean-going steamers. The 60 per cent ore is towed 200 miles down the Tayeh river to the Hanyang works, and coal is towed 200 miles down another river to the works. Erection of the plant was started in 1891, the original plan being that of using ore from a point some 75 miles down the Yangtse-Kiang river, with coal mined near the plant. The coal proved unsuitable for smelting, and the present system has supplanted the original. The works are nothing, from the American standpoint, producing only about 500 tons of pig iron daily, while the duplex steel plant involves two 15-ton converters, now being installed, with four open-hearth furnaces making about 250 tons of steel ingots daily.

While very little, relatively, is known of the geology of China, enough is known to make it obvious that there are vast possibilities. We used to be amused by the tales of American and British engineers who had had experience with Chinese methods and Chinese labor. The ridiculous inefficiency of the labor and the adherence of the people to weird traditions incited our risibilities, but those are things which can change. The fact that China has been so utterly immature is the best evidence of what can be done in the future, when already China has at will sent her pig iron into the United States.

The wages being paid at the Hanyang works average less than $5 per month for common labor, while skilled labor is paid an average of about $5 per month, the rate only in rare instances reaching $10. In all countries the development of the iron industry has been one of the gradual supplanting of labor by machinery. We are always prone to fall into the misapprehension that the adoption of labor-saving devices is merely a sequence to their invention, but the fact is that their invention is a sequence to advancing costs of labor and to the general growth in industry which makes the adoption of such new devices feasible. They come in their turn; China is not ready for them, and does not need them with her remarkably low costs for labor, even though that labor is quite inefficient, judged by our standards. It is not material that China has not large amounts of capital to invest in works built according to American standards.

It is necessary that the people of the United States should realize that they must continue to keep in advance in their industries, that these industries cannot reach a point at which it can be said that there is nothing left to be done. The production of iron and steel in the crude forms represents but one stage, and as to that stage China may not be many decades from pushing us very close, but the crude forms of iron and steel are merely for adaptation to a multiplicity of uses, many now known and many yet to be developed. There is every room for pushing the adaptation farther and for opening channels of distribution for the finished products which merely use iron and steel as their raw material. In such work, China can be kept far in the rear, however large her natural resources and however cheap her labor.

INTERESTING HISTORY OF A GREAT IRON JOURNAL.

In celebration of its semi-centenary *The Ironmonger,* London, Eng., published in the Sept. 4 issue one of the most interesting and thoroughly readable articles that it has printed in years, for it was a well written and illustrated history of *The Ironmonger* itself, covering a period of 50 years.

In 1850, William Vaughan Morgan, second of six brothers who left their home at Glasbury, in Brecon, and established themselves in business in London, acquired the business of Halse & Son, druggists' sundriesmen and hardware factors. One by one, the other Morgan brothers entered the firm until finally all were bending their energies toward its upbuilding. How well they succeeded through the employment of upright and enterprising methods, has now become

a part of the business history of the city of London.

Early in 1859, it occurred to the partners that a new idea in pricelists might prove popular, something between a periodical and a catalog, for it was customary for business houses in that day to charge for their trade catalogs. So on May 31, 1859, appeared the first number of *Morgan's Monthly Circular and Metal Trades' Advertiser*.. After three numbers had appeared the success of the venture was so well assured that with the issue of Aug. 31, 1859, the title was changed to *The Ironmonger and Metal Trades' Advertiser*, as it is today. Mapping out a broad and liberal as well as sterlingly honest course, the proprietors have held to it consistently without swerving. From a modest pricelist it has grown into a great iron, steel and hardware journal of this day, read and quoted around the habitable globe as one of the real trade authorities.

Of the original Morgan brothers who established and still publish several other trade papers beside *The Ironmonger*, three have died; Thomas Vaughan Morgan in 1885, Octavius Vaughan Morgan in 1900 and William Vaughan Morgan in 1892, all of them having gained civic as well as trade prominence. The others, Sir Walter Vaughan Morgan, ex-lord mayor of the city of London, Septimus Vaughan Morgan, of all the brothers most closely associated with the trade journal's establishment and development, and Edward Vaughan Morgan have also attained prominence in the social life of London. The latter has devoted a large portion of his life to the manufacturing concern, the Morgan Crucible Co., Ltd., of London. In 1898 Gwyn Vaughan Morgan, son of Septimus, and Penry Vaughan Morgan, son of the late Octavius, extended the partnership. The trade mark of the original Morgan Bros., a bunch of faggots, was distinctively characteristic of their loyalty to each other. The sturdy manner in which they early undertook and discharged the public exposure of humbugs and dishonest dealers in the hardware, iron and steel trade of Great Britain showed their loyalty to the honest tradesmen and manufacturers of their native land. One of the early editors of *The Ironmonger* was John Cargill Brough, father of the late secretary of the Iron and Steel Institute. The present editor is A. C. Meyjes, who took the chair in 1893. The present publisher is J. E. Glass, appointed in 1902.

One cannot spend any more profitably a half hour than in reading "Chapters in Our History" contained in the number of *The Ironmonger* of Sept. 4, for they prove to be at once a delight and an inspiration.

As *The Ironmonger* enters its 51st year, it gives us pleasure to extend congratulations upon its splendid record and to wish it even greater success in the future.

ORE HANDLING RECORDS.

Mines, Docks and Railroads Are Doing Remarkable Work.

Wakefield, Mich., Sept. 20.—The depth of the workings considered, it is believed that an ore hoisting record recently made at Ferdinand Schlesinger's Newport mine on the Gogebic range stands unprecedented in the Lake Superior iron country. During the course of one day and one night, a total of 4,005 tons was brought to the surface through "D" shaft, which is bottomed at 2,200 feet and is one of the very deepest in the region. Practically all the ore came from below the seventeenth level. Some big work with the steam shovel also has recently been accomplished at the Newport. All Gogebic range records were broken when one crew loaded close to 6,000 tons of ore from stock pile in 10 hours' time. One hundred and fifteen 50-ton cars received their cargoes during that period. The Gogebic's previous best record was 109 cars, loaded at the Ashland mine. At the same time that the Newport steam shovel men were setting a new mark for the Gogebic range, a crew at the Tobin mine at Crystal Falls was engaged in doing equally good work on the Menominee range, this crew also unloading 6,000 tons of ore from stockpile in one shift of 10 hours' duration.

The season's record in vessel loading is held by the Chicago & Northwestern docks at Ashland. In fact, it is believed that the time credited to that system of ore piers has never been exceeded on the upper lakes. Arriving at the dock at 7 a. m., the steamer W. E. Corey began loading at 7:10 o'clock and, after 20 minutes had been consumed in shifting the vessel, the boat had received her cargo and was ready to leave at 8:33. The actual time in loading was one hour and three minutes. The cargo consisted of 10,234 tons. The biggest day's record to the credit of the ore-hauling railroads of the region is held by the Steel Corporation's Duluth, Missabe & Northern, and was achieved recently when 136,000 tons of ore were transported to the docks at West Duluth from Mesaba range mines.

Reports have been in circulation recently to the effect that John R. Walsh's Wisconsin & Michigan railroad was to be taken over by the Chicago, Milwaukee & St. Paul, and was to be used in the ore traffic by that big system. It was also said that, following its absorption, the line was to be extended to Escanaba. The story was improbable on its face, and no official denial was needed to discredit it in mining circles. The Chicago, Milwaukee & St. Paul, which now utilizes the tracks of Senator Isaac Stephenson's Escanaba & Lake Superior railroad in hauling its trains to the Lake Michigan ore shipping port, will eventually have its own direct line to Escanaba, but the Wisconsin & Michigan will not be a part of it.

An interesting report, and one that is given some credence, is that the Chicago & Northwestern is planning the construction of a second track from Iron Mountain to the Iron river district, at the western end of the Menominee range. The Northwestern is the possessor of the old Escanaba, Iron Mountain & Western railroad, promoted by Ferdinand Schlesinger, of Milwaukee, a score or more years ago, but never completed by him, and it is the reported plan to utilize the unfinished roadbed of that projected line, extending from Iron Mountain almost half way to Iron river. The erection of the ore dock, which is to take the place of the Northwestern's old No. 5 pier, now being dismantled at Escanaba, will be started shortly, it is understood. Probably more than three-quarters of a million dollars will be expended in the work. The dock will be available early next summer.

The Appleton Wire Works Co., Appleton, Wis., announces that it will make extensive additions to the plant at once. A new building, 120 x 100 feet, two stories, will be erected at Atlantic and Union streets. Fifteen new looms, making a total of forty-seven, will be installed in the addition. Paper mill screens are the main product.

AMONG MACHINERY MAKERS.

NEW YORK.

Slight Decrease In Demand for Machine Tools—Few Price Changes.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Sept. 21.

The majority of machine and tool-selling interests in this city report the business of the first half of this month as somewhat less active than during August, and are rather at a loss to explain the failure of the trade to show the expected betterment, now that the holiday season is out of the way and preparations are being made for fall activities. One of the largest manufacturing interests, however, is finding no material let-up in its bookings, as its sales are now at a rate well in excess of its production. This interest has taken a number of scattering orders for railway shop equipment, none of them particularly large, but in the aggregate making an attractive showing; naturally these are mostly heavy tools. Another important factor in the trade reports its heaviest demand in small tools, although it has recently secured an order from the Central of Georgia for considerable shop equipment and has taken some important crane business. Prices show no material changes, and none is expected. Throughout the depression there was surprisingly little cutting, except in a few lines which have already firmed up again, and there will probably be no attempt made at advancing the present schedule until conditions are considerably more active.

Although the demand for certain classes of equipment required in the manufacture of automobiles is still heavy, there is a general expectation that the next six or eight weeks will witness the completion of most of this buying. The F. I. A. T. list has practically all been closed, the business being divided among three or four local houses and one or two manufacturing interests making a practice of selling direct. The Long Island manufacturing district, however, promises to develop a large volume of business when the Packard, Palmer-Singer and Brewster plants are sufficiently far along.

Bids close today on a small list of tools for the battleship Florida, now building at the Brooklyn navy yard. The list includes an extension lathe, two tool room lathes, a radial drill, a sensitive drill, a shaper, a universal milling machine, an emery grinder and a cylinder boring machine. A number of local houses are interested in the awards.

Inquiries have just been put in circulation for 100 industrial cars for export to South America. These are to have steel underframes, with a capacity of 20,000 pounds each and are intended for banana plantation service.

The acquisition of the Baltimore Car & Foundry Co. plant by the Standard Steel Car. Co., Pittsburg, and the filing of incorporation papers for the Baltimore Steel Car & Foundry Co., with a capitalization of $1,500,000, are expected to result eventually in the purchase of considerable equipment for this manufacturing concern, which is one of the largest in the Baltimore district. Although it has been operated steadily since it became involved in financial difficulties and is now a "going" concern expenditures for equipment have naturally been held down to the minimum during the past two years. Some replacement of tools will have to be done, and this is likely to be quite generous, particularly as it is understood that the capacity of the plant will be considerably increased. The same program is anticipated in the case of the Middletown Car Works, also recently acquired by the Standard company.

The Baldwin Locomotive Works, Philadelphia, advise us that current press reports to the effect that the foundry capacity of the Eddystone plant is to be materially increased are untrue.

Tentative plans have been prepared for the construction of a large power dam in the Susquehanna river near Towanda, Pa., with the idea of furnishing electric current to a number of towns in that section. M. E. Lilley, of Towanda, is interested.

CLEVELAND.

Steady Improvement in all Lines of Machinery.

Office of THE IRON TRADE REVIEW.
Browning Building, Sept. 21.

The local machinery trade is showing steady improvement in all lines. There is a marked demand for automatic machinery, and several manufacturers in this line report that they are unable to keep up with orders. The demand for large tools is becoming more pronounced, and local dealers report that inquiries received during the past month hold considerable promise. Cranes and hoisting machinery are in demand and the contracting business is better than it has been for some time. Building projects are numerous and plans are being prepared by various concerns for extensions to their plants.

The G. H. Williams Co., designer and manufacturer of hoisting, conveying and excavating machinery, advises that its sales on clamshell buckets have increased very perceptibly during the past few months, July sales amounting to something like 25 buckets. The character of recent inquiries received by this firm is very much better than those of the earlier part of the year, as they are for immediate delivery, while earlier inquiries were for prices on delivery when contracts had been consummated, leading into the future.

The W. W. Sly Mfg. Co., manufacturer of foundry equipments, advises that its business has grown to such an extent that new equipment was recently installed. The company's working force has been increased about 10 per cent during the past month.

A like increase in working force is reported by the Chisholm & Moore Mfg. Co., which states that its business during the past month has been the best that it has had since 1907.

The Canton Foundry & Machine Co., Canton, O., advises that while its business is not yet up to the 1907 level, there has been an improvement during the past few weeks. The company is now manufacturing a new line yet in its infancy, that of its "Universal" patented automobile turntables.

The Acme Boiler & Construction Co., Canal Dover, O., is constructing a 100,000-gallon tower tank for the city of Minerva, O., and in addition to this, has several other smaller contracts on hand. The company in the near future expects to put on the market a new water tube boiler of its own design.

The Atlas Car & Mfg. Co. reports that its business is good, and that inquiries are coming in rapidly. A number of orders are now being closed for electric locomotives, storage battery locomotives, and large cars for rolling mills and mines. In addition to this, the concern has a number of industrial railroads under contract.

The W. M. Pattison Supply Co. advises that its trade during the summer months has been practically

double that of the same months last year, and that it anticipates a very satisfactory trade during the autumn and winter months.

The local office of the Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., advises that the demand for drop hammers and for automatic heading machines is particularly good at this time. The past three months have brought a steady increase of business. At the present time, orders are about 85 per cent of the company's facilities.

The Dayton Globe Iron Works, Dayton, O., has recently received a contract from the United States government for two 44-inch improved new American turbines, to be installed vertically in open concrete flumes, and to be complete with gears and special bed plate to receive air compressors which will be built by the Hall Steam Pump Co., of Pittsburg. These will be installed in the turbo-compressor plant which the United States government is erecting at Lock No. 5, of the Monongahela river. These turbines will be of a special nature, brass fitted, so as to prevent the corroding effect caused by the water of the Monongahela river. The receipt of the following orders is also reported: From the Beaver Valley Water Co., Beaver Falls, Pa., for two vertical turbines, one 51-inch wheel and the other a 19-inch wheel, each complete with vertical and horizontal shafting and bevel gears, and arranged to direct connect to the pumping units; from Cromwell & Connell, engineers, New York City, for the complete headgate hoisting mechanism for four 6 feet x 17 feet 6 inches gates, which will be installed in the new hydro-electric plant now being built by the Uniform Fibrous Talc Co., near Hyatt, St. Lawrence county, N. Y.

Owing to the great increase in the present business and the number of large orders for the future, the Ohio Steel Co., Lima, O., has found it necessary to increase its working facilities and let contracts for new buildings and equipment. There will be two new buildings added to the present plant, which, when completely equipped, will almost double the present capacity of the plant. The contract for these two buildings, one 200 x 75 feet and the other 50 x 35 feet, was awarded to the Variety Iron & Steel Works Co., Cleveland. These additions are to be modern and substantially constructed at a cost of $30,000, and will be completely equipped with machinery to the value of $10,000 additional.

The Youngstown Sheet & Tube Co., Youngstown, O., has given the William Tod Co., also of Youngstown, the contract for the blowing engine for the new blast furnace now being built at the East Youngstown plant. The engine is of the cross-compound horizontal type, and is a duplicate of the engines now in use at furnaces "A" and "B" of the same plant. The blowing tubes are 90 inches in diameter with a 72-inch stroke, and the engine represents an outlay close to $80,000.

The Hoppes Mfg. Co., Springfield, O., has recently shipped to the Metropolitan Street Railway Co., New York City, one of its 25,000 horsepower, Class R type, open exhaust steam feed-water heaters. This machine is to take the place of the closed type secondary heaters now in use at the Ninety-sixth street power plant.

The Van Dorn Electric & Mfg. Co., Cleveland, has increased its capital stock from $50,000 to $150,000.

The Cleveland Crane & Engineering Co., Wickliffe, O., advises that its business has been prospering considerably during the past six months, contracts being 100 per cent in excess of what they were in the spring, and prices at least 10 per cent better. Owing to this increase in business, the company has been working its force 24 hours a day for some time. Among recent contracts taken over by this concern are the following:

For the Kalamazoo Paper Co., Kalamazoo, Mich., coal handling plant having a capacity of 25 tons per hour and designed to unload from the cars and carry coal to the bunkers, or transfer from cars to storage piles to be rehandled later when occasion demands. Contract includes trackage for same, with direct current power system.

For the Allyne Brass Co., Cleveland, a two-motor, five-ton crane, to be floor operated.

For a concern in Melbourne, Australia, a 55-ton ladle crane with a 10-ton auxiliary hoist.

For the Jenney Electric Mfg. Co., Anderson, Ind., a five-ton crane, gear brake type, with 50-foot span.

For the Plate Ice Construction Co., Pittsburg, a 10-ton crane, with twin hooks, 70-foot span.

For the Terre Haute, Indiana & Eastern railroad, Terre Haute, Ind., a 30-ton crane.

For the Cleveland Worsted Mills Co., Cleveland, a 30-ton three-motor crane.

In addition to these, this concern has recently made the last shipment on a government contract for machinery to be used in the construction of the Panama canal, this consisting of 14 two-ton, three-motor cranes for handling cement, with 4,000 feet of trackage for same; three rapid sand handling plants with capacity of 600 cubic yards per hour, with gantry cranes, 35-foot cantilever extensions, 600-volt direct current system, third-rail equipment; and for the Cambria Steel Co., seven 10-ton cranes; one 15-ton crane, 118-foot span, with twin hooks, for the main hoist, and a single hook five-ton auxiliary hoist.

New equipment recently installed by this concern includes a high-speed saw for cutting shapes, purchased from Joseph T. Ryerson & Son, Chicago; an Ingersoll-Rand air compressor and several machine tools.

CINCINNATI.

Machinery Men Place Orders Ahead in Anticipation of Continued Activity.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Sept. 21.

Evidences of the improvement in the demand for machine tools and the expectations of a continuance of activities are apparent all through the machine tool plants here. New equipment is being installed and additional facilities and additions to plants are under way. The foundries are busy turning out castings for machinery builders and are adding to their equipment. Purchasing departments of the plants are placing orders for material in advance of actual needs seeking to build up stock room supplies. The mills being unable to make prompt deliveries furnishes reason for placing specifications ahead of current wants and the advancing tendency in pig iron prices induces the shops to place orders for castings ahead of immediate requirements. The contracts for castings being mainly on a sliding scale basis the foundries are obtaining satisfactory prices for their product and are fully engaged in turning out the orders.

Orders for machine tools are coming in in good volume and stock made up during the depression is disappearing rapidly. Early deliveries can still be made by a number of the shops, but there are some manufacturers sold up for three and four months.

The shops are running full time and some overtime work is done. The scarcity of help is still a feature in the situation and the shops are finding difficulty in filling up their floors with men.

The Bradford Machine Tool Co. is at work on an extension of its shop. One new shed will be completed this week. The blacksmith shop has been remodelled. Several new machines have been purchased and are ready for in-

stallation. Another shop shed is contemplated and the company is making preparation for enlarging its out-put of lathes. Orders are reported as coming in steadily and the stock on the floors has been practically sold out. A good run of orders was received by this company this week.

The American Laundry Machinery Mfg. Co. has under construction a large plant at Rochester, N. Y. Several acres of ground have been secured and the buildings are now under way. There will be 14 buildings when all are completed, one for each department. These will be connected and used for boiler and engine rooms, wood working department, stock rooms, assembling rooms, machine shops, etc. An immense foundry is to be built where the castings will be made for a number of the other shops. When completed the plant will be the largest laundry machinery plant in the world.

The John B. Morris Foundry Co. has opened a new display room for its machine tools on Eighth street near Freeman avenue. This is also a warehouse for the company. The foundry is being equipped with new devices, a number of which are now in operation. Purchases of several molding machines have been made recently and will be installed at once. An entire new set of tumbling mills have been installed in the cleaning room. The plant is busy in all departments.

BUFFALO.

Market is Not Much Changed—New Buildings are Planned.

Office of THE IRON TRADE REVIEW, 932 Ellicott Square, Sept. 21.

Little change has taken place the past week in the volume of business done at this point by machinery makers, unless it has been an increase in demand for smaller grades of mechanical appliances. All interests are hopeful and recognize a substantial tone in the existing conditions and apparently feel confident that the market will not only hold its own the balance of the year but should add strength and volume of tonnage. The number of smaller manufacturing enterprises, either making machinery or in the market for it, shows an increase at this time.

The Kingsford Foundry & Machine Works Co., has decided to build a one-story addition to its plant and will call for bids at an early date. The Niagara Pulp Board Co., Niagara Falls, N. Y., has decided to rebuild the plant which was recently destroyed by fire and plans for the new factory building and mechanical equipments are now being worked out; A. F. Oliver Mfg. Co., of Buffalo, is extending its present manufacturing facilities by the addition of a machine shop, three stories, 25 x 27. The Standard Mirror Co., of Buffalo, of which William LaHodry is president, will build a manufacturing plant, 80 x 300. The plans have not been started nor the machinery equipment decided upon. The New York Central & Hudson River. Co. is planning an extensive improvement at Norwood, N. Y., including a 10-stall engine house, fan house, machine shop, boiler house and store room. The improvements will cost $50,000. The railroad's chief engineer has charge of the work. The Lockport Light, Heat & Power Co., has asked for bids on coal bins, cars, trackage and trestle work.

In the last issue of THE IRON TRADE REVIEW, a statement was made to the effect that the Cleveland Punch & Shear Works Co. is working on a large order for punches for the Lackawanna Bridge Co., Buffalo. This order was received by the Cleveland concern through Joseph T. Ryerson & Son, Chicago.

MILWAUKEE.

Business Continues Active In All Lines of Trade.

Milwaukee, Wis., Sept. 21.—The structural iron field is experiencing much the same business increase as the machinery lines in the Milwaukee district, and manufacturers and jobbers report capacity operations, with prospects of over-time operations during the fall and winter to take care of spring delivery contracts. Apparently the country will experience an immense building boom next year and large contracts are now being placed.

H. E. Bayley, president of the Bayley Structural Iron Co., of Milwaukee, says: "We have noticed an increase of approximately 50 per cent in our business in the last two months. The mills are overloaded with orders and labor is hard to get. From all indications these conditions of prosperity are likely to last, unless some unforeseen disaster should come upon us."

William J. Wolf, superintendent for the American Bridge Co., who passed through Milwaukee on his way from Ironwood, Mich., to Crystal City, Mo., on a big erection job, said: "Our concern is rushed with orders. The business shows an immense increase over last year. The outlook is most promising." Mr. Wolf will superintend the construction of a large plant for the Pittsburg Plate Glass Co., at Crystal City, near St. Louis.

The Fred M. Prescott Steam Pump Co., of Milwaukee, has just shipped a pump of 8,000,000 gallons capacity, to Waukegan, Ill., for the municipal water works system. Another pump of similar capacity is being erected for the municipal water works at Phoenix, Ariz., this week.

The machinery exhibits at the Wisconsin State Fair, Milwaukee, Sept. 13 to 17, were the largest ever made. All of the larger manufacturers of engines, especially for farm use, made displays and report good business and prospects.

The Milwaukee Electric Railway & Light Co. announces that all of the 100 new pay-as-you-enter cars, to be delivered Nov. 1, will be equipped with pressed steel wheels, partly forged, instead of the chilled wheel now in use.

The Western Machinery & Supply Co. has been incorporated in Milwaukee to succeed to the business of Isidor Cohen, dealer in high grade second-hand and new equipment for factories, etc. New quarters have been leased at 192-194 Reed street.

The Business Men's association of Peoria, Ill., has invited the Portage (Wis.) Boat & Engine Co. to locate there. Portage business men are striving hard to retain the establishment.

The Chatfield Brass & Iron Works, of Escanaba, Mich., is installing new boilers and engine in a new boiler house, just completed and will increase its capacity about one-third.

The new plant of the Waukesha (Wis.) Motor Co. is nearly ready for occupancy. Removal from the North street plant will begin in a week or two. One hundred additional hands will be employed.

Alfred S. Koto and Thomas Odee, of Beloit, Wis., have organized a company to operate a manufacturing plant in the former Johnson wagon works on Race street, Beloit. The nature of the proposed product is not yet announced. Mr. Koto has been assistant manager of the Warner Instrument Co., manufacturers of timing devices, speedometers, and railroad specialties, and Mr. Odee was general foreman of the gas engine department of the Eclipse works of the Fairbanks-Morse Mfg. Co., at Beloit, for six years.

The plant of the Bath Foundry & Machine Co., Bath, Northampton county, Pa., was recently damaged by fire to the extent of $25,000.

INVESTIGATION OF AN ELECTRIC SHAFT FURNACE

Report on the First of the Type, Erected at Domnarfvet, Sweden.

By Eugene Haanel, Ph. D.[1]

In the winter of 1905-06, a series of experiments in electric smelting were conducted at Sault Ste. Marie, Ontario, under the auspices of the Dominion government, with the object of establishing the feasibility of economically smelting Canadian magnetic iron ores comparatively high in sulphur, but free from manganese; and using charcoal as the reducing agent.

As a result of these experiments, the electro-metallurgy of the reduction of refractory iron ores without the use of coal or coke fuel was established; and—as far as could be expected from a small, experimental furnace—the output of pig iron per electrical horsepower year, determined. Moreover, based upon the experience thus gained, certain fundamental changes and improvements, necessary in the construction of an economic electric furnace in the future, were suggested;[2] in order to render it suitable for the production of pig iron on a commercial scale.

Although the Canadian experiments of 1905-06, proved entirely successful—as regards the special objects aimed at; and while considerable interest in the reduction of iron ores by the electro-thermic process was manifested at the time, no additional experimentation of any significance has been undertaken in Canada, along the lines suggested in the Mines branch report, to insure the commercial success of electric smelting. In Sweden, however, where the conditions governing the economical use of the raw materials necessary for an iron industry are very similar to, and in many respects identical with, those existing in several of the provinces of the Dominion of Canada, the importance of an economic, commercial, electric smelting process was fully realized by three young Swedish engineers some two years ago. These engineers: viz., Assar Grönwall, Axel Lindblad, and Otto Stalhane—stimulated by the successful results of the work done at Sault Ste. Marie—undertook to solve the problem of designing and constructing a commercial electric furnace.

In as much as the electro-metallurgy of the reduction of iron ores had been established by the Canadian experiments, these Swedish inventors concentrated their entire efforts in an attempt to solve the practical, commercial problem, along the lines suggested in the official report. In carrying out their plans to a successful issue, they were ably assisted by the ironmasters of Sweden, who manifested great interest in this question. Special assistance was rendered by the able, and far-sighted director—E. J. Ljungberg, and the vice-director—Lars Yngström, of the largest and most influential industry company in Sweden: the "Stora Kopparbergs Bergslags Aktiebolag." The inventors made an agreement with this company, and the "Trafikaktiebolaget Grangesberg—Oxelösund" (owners of the largest iron ore deposits in Sweden), to carry on smelting experiments on a large scale at the Domnarfvet iron works.

In order to concentrate their undivided attention on this problem, the inventors formed a company called the "Aktiebolaget Electrometall," to which the patent rights were assigned.

Evolution of the Electric Shaft Furnace.

The construction of the specially designed electrical machinery, and the preliminary work necessary for the construction of the furnace were commenced April, 1906; and towards the end of that year—when the installation of the electrical machinery and high tension cables, etc., was completed—the construction of the first electric shaft furnace was begun.

This furnace was put in operation April, 1907, and from that time experiments were continuously carried on and improvements made: the daily experience thus gained being utilized in successive changes in design and reconstruction towards perfection. All experimentation was conducted along scientific lines, and has yielded a rich fund of useable knowledge and instructive data as follows: (1) on the construction and operation of electric furnaces; (2) on the conductivity and other characteristics exhibited by materials when subjected to high temperature; (3) on the qualities of the refractory lining materials, and (4) on the most suitable manner of designing and constructing the masonry of the furnaces. In addition to this, different methods of supplying the current, and various contact devices, etc., were tried and tested. In these initial steps, the experimenters did not confine their entire attention to the practical side of electric smelting; but carried on laborious researches and investigations concerning the solution of purely theoretical problems; and the determinations made and data gathered, will doubtless form an important contribution to the electro-metallurgy of iron and steel.

Taking into consideration the fact that, the inventors have signified their intention of writing a detailed account of all the experiments conducted by them during the past three years, it will be unnecessary for me to enter into minute details; but to set forth only such facts as have a direct bearing on the experimental trials witnessed at Domnarfvet.

With a view of elucidating a number of disputed technical points involved in the smelting process itself, initial experiments were conducted at Ludvika during the summer of 1907, with a small furnace of 300 horsepower capacity. During these preliminary experiments many difficulties were encountered which had to be overcome; and it was not until the summer of 1908 that they succeeded in designing and constructing a furnace which, in their opinion, could be economically used in practice. Towards the end of the summer a number of experiments were made with this furnace, which demonstrated that the type evolved was durable, and that a good output could be obtained therefrom; notwithstanding the fact that the furnace was constructed with a relatively low shaft in order to reduce the building expense. On account of this low shaft, which was open at the top—as in the case of the furnace employed at Sault Ste. Marie—the consumption of charcoal was large: viz., 460 kilograms per metric ton of pig iron produced. A

[1]Director of Mines, Canada.

[2]Report on Electric Smelting Experiments at Sault Ste. Marie, Ont., 1907, p. 92.

considerable portion of this charcoal was consumed at the top of the open shaft, and the gas escaping from the furnace consisted almost wholly of carbon monoxide. Hence, notwithstanding the excellent results obtained with this furnace, the inventors conceived that by utilizing the waste gases, even more economic results could be attained; consequently decided to construct a new one of larger capacity, with a higher and more rationally designed shaft.

This new furnace was completed early in December, 1908, and the intention was to at once begin an extended trial run; but owing to a severe drought—such as had not been known in Sweden for generations—this extended trial had to be postponed. Some time previous to the completion of this furnace, the inventors tendered the writer an invitation to witness a short trial test to take place early in December. Although little rain had fallen up to this time, hopes were entertained that by the middle of December there would be sufficient water to carry on the contemplated experimental trials.

Soon after receiving the invitation, I received official instructions to proceed to Sweden to investigate and report upon this new electric shaft furnace, and immediately made preparations for the trip, and sailed for Europe, via New York, on November 25, 1908. Just as the steamer was about to start, I received a cablegram from Sweden announcing the impossibility of running the furnace, on account of low water in the adjacent river. It was then too late, however, to cancel my passage, hence I decided to continue my journey and obtain as much information as possible concerning the furnace.

Immediately on my arrival in Stockholm, where I met Mr. Grönwall—one of the inventors of the furnace—it was arranged that we should go to Falun for the purpose of placing before Mr. Ljungberg, the general director of Stora Kopperbergs Bergslags Aktiebolaget—at whose works the furnace was erected—the great importance to Sweden, as well as other countries, of making, if possible, the contemplated special trials. As a result of this conference, he very generously allowed the use of power to operate the furnace for twelve days. This concession, which entailed considerable inconvenience in the general operations of the steel plant, shows the great importance attached to the solution of this metallurgical problem by men competent to judge.

The inventors informed me, however, that they did not expect entirely satisfactory results as regards the output of pig iron per electrical horsepower year, since a furnace of this size could not possibly arrive at its normal working condition in the short time allowed for the test; inasmuch as the walls are so thick that it takes a comparatively long time to heat them entirely through; and acceleration of the heating could only be accomplished at the risk of damaging the furnace walls. In addition to this, the shaft should not be filled to the top until after several days' working.

In concluding this preface, it may be mentioned that, the experimental trials witnessed were not conducted for the purpose of determining the output of pig iron per electrical horsepower year—this had been satisfactorily determined by the experiments at Sault Ste. Marie; as well as by the Swedish inventors in their experiments with the furnace preceding the one investigated at Domnarfvet—but to demonstrate the commercial feasibility of the furnace, and to prove whether uniform working without disturbance could be expected.

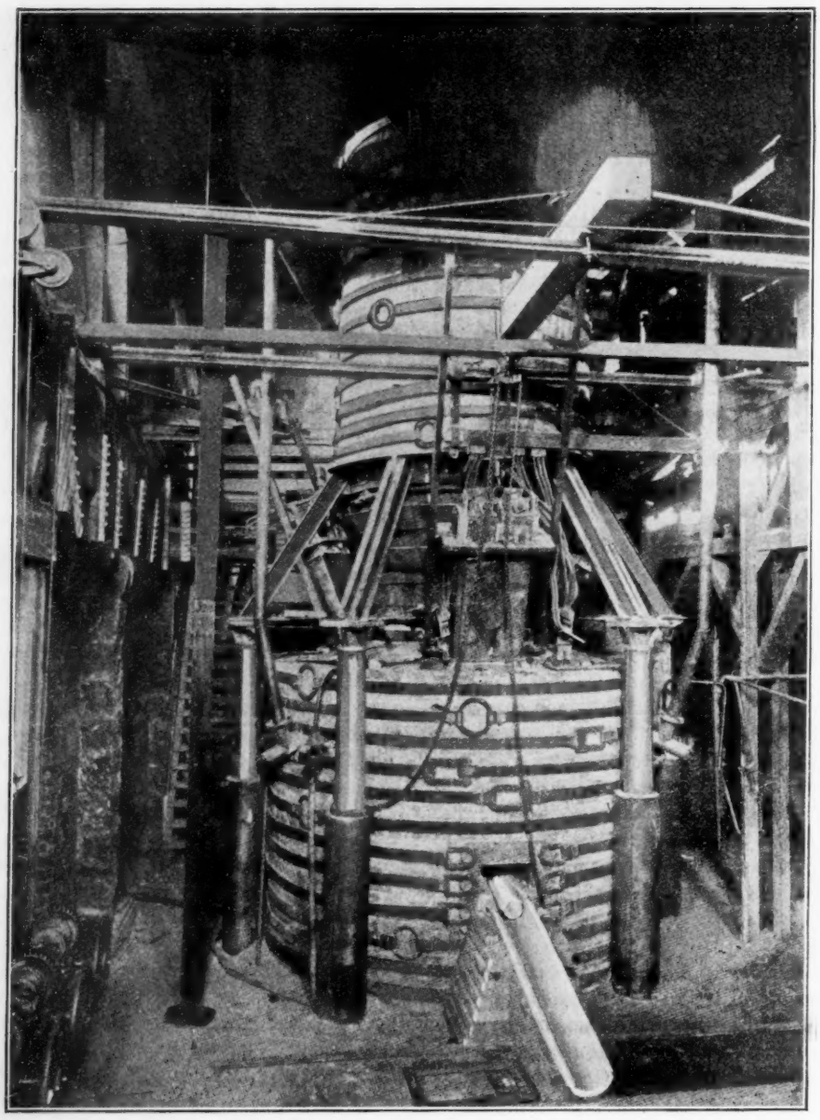


FIG. 1—EXPERIMENTAL ELECTRIC SHAFT FURNACE.

Description of the Plant.

The experimental plant (Fig. 1) was installed in an old building adjoining the basic Bessemer converter house.

The machinery, which was specially designed and constructed for the experimental trials, consists of a three-phase synchronous motor of about 900 horsepower, supplied with a current of 7,000 volts, and 60 periods, from a three-phase cable line in the iron works. This motor is directly coupled to a three-phase generator, which supplies current of 25 periods, adjustable to between 300 and 1,200

volts, through small intervals to the transformers erected in the immediate vicinity of the furnace.

By means of this extensive regulation it is possible to determine the most suitable voltage to be employed with furnaces of different construction, and operating under various conditions.

The fields of both the synchronous motor and the generator are fed with current at a tension of 220 volts, from a direct current generator, 20 kilowatt capacity, directly coupled to the system. For starting the system a three-phase synchronous motor, directly coupled, is employed. This is fed with a current stepped down to 500 volts.

From the switchboard the current is conducted, through copper bars, laid in cement channels, to the three-phase transformers. The capacity of these transformers is 1,500 K. V. A., and their ratio of transformation, 14:1. By regulating the tension of the generator, the low tension sides of the transformers can be altered through small intervals, from 20 to 85 volts. The ratio of transformation can be altered to 7:1 by means of certain easily performed changes of coupling in the transformers; in which case the low tension can be varied between 40 and 170 volts. The transformers are cooled with air supplied under pressure by two electric blowers.

A switchboard is situated conveniently near the furnace for controlling its operations: on which are mounted the following instruments: 1 three-phase precision wattmeter for differently loaded phases; 3 ampere meters —one for each phase, and 1 voltmeter.

The ampere meters, and the wattmeter, are connected to the current system by means of transformers. The voltmeter and tension terminals of the wattmeter are directly connected to two of the conducting bars.

To protect these instruments from heat when tapping, an iron curtain, which may be lowered or raised, is placed in front of the switchboard. The external appearance of the arrangement is shown by the photograph—Fig. 2. It will be seen that the wheels—by which the electrodes are adjusted—are placed under the instruments in such a manner that, the wheel and ampere meter opposite each other, belong to the same phase.

Description of Electric Shaft Furnace.

In general appearance this electric shaft furnace is unlike any hitherto constructed; being very similar in design to an ordinary blast furnace in which the tuyéres are replaced by electrodes.

A vertical section of the furnace is represented by Fig. 3; and Fig. 4 shows a top view with the shaft and electrodes removed.

The height of the furnace above ground level is about 25 feet. The melting chamber or crucible containing the electrodes is about 7 feet high, and is of greater diameter than any other part. The shaft is about 18 feet high, the lower end of which—for about 4 feet—has the form of a truncated cone; for the purpose of directing the charge into the crucible in such a manner that the electrodes, lining, and descending charge, could not come in contact. This special feature in the design was introduced by the inventors after repeated experiments: which demonstrated that the upper surface of the column formed by the materials charged into the furnace assumes a definite angle: viz., 50 degrees to 55 degrees to the vertical, when the materials—crushed to normal size, and at the same temperature as that existing in the melting chamber—are allowed to fall through a circular aperture into a free space. In Fig. 3 the slope is indicated by dotted lines.

It is this isolation of the descending charge from the lining at the point where the electrode enters the furnace that constitutes the particular economic advantage of the construction; since it prevents the destruction of the lining: which occurred in all previous furnaces where the electrode came directly in contact with the melting charge and the lining; for the temperature of the brickwork in close proximity to the electrodes becomes so great that the most refractory

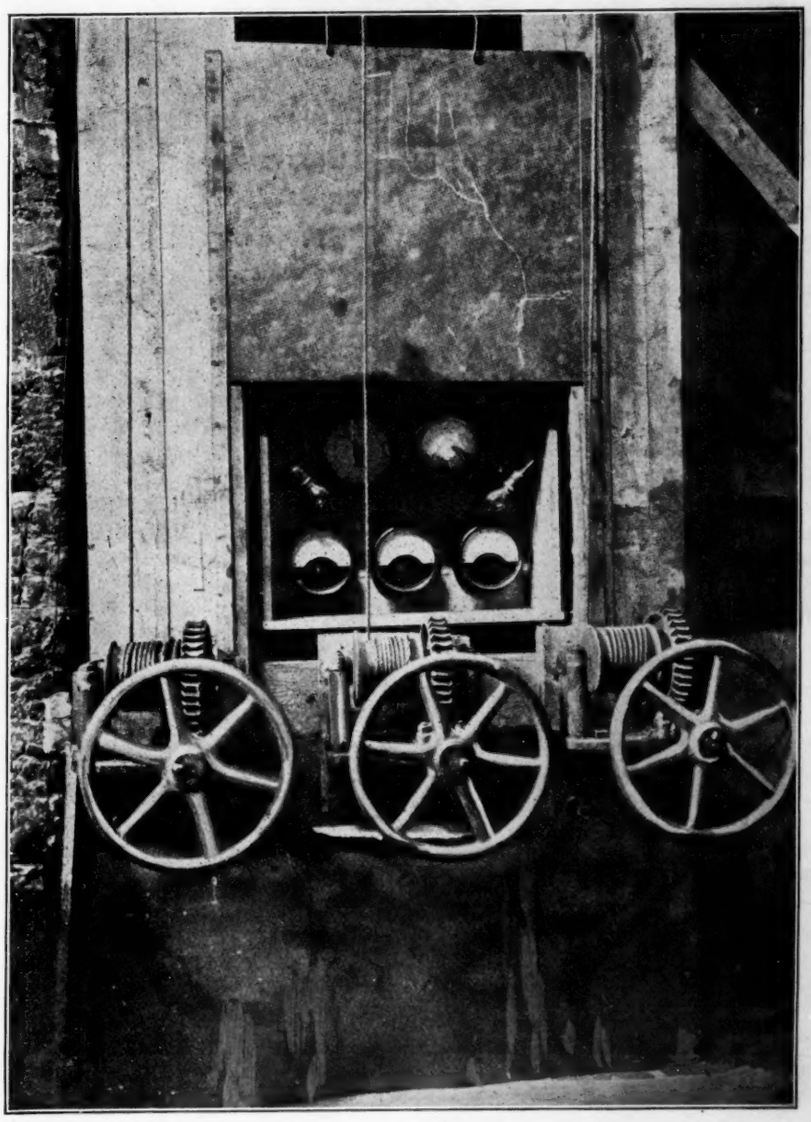


FIG. 2—ARRANGEMENT OF SWITCH-BOARD.

lining materials are rapidly destroyed —even when the electrodes are cooled by water jackets.

The contracted neck of the shaft immediately over the central opening into the melting chamber, is not supported by the arched roof, but the entire weight of the shaft is carried by six cast iron columns arranged symmetrically around the furnace hearth.

The melting chamber is made in the form of a crucible, and is covered with an arched roof provided with openings for the reception of the electrodes and descending charge. The roof and walls of the crucible are lined with magnesite.

For the purpose of cooling the brickwork composing the lining of the roof of the melting chamber, and thereby increasing its life, three tuyeres are introduced into the crucible —just above the melting zone—through which the comparatively cool, tunnel-head gases[3] are forced against the lining of the roof into the free spaces. This gas absorbs heat from the exposed lining of the roof and walls, and the free surface of the spreading charge; thus effectively lowering the temperature of the roof and exposed walls.

With the exception, however, of radiation from the tuyéres, no heat is lost by this method of cooling, or lowering of temperature; since the heat given up by the lining of roof and wall to the comparatively cool gas introduced through the tuyéres, is imparted in passing upward through the shaft to the cooler portions of the descending charge. This effects not only a better utilization of the reducing power of the CO; but in addition, produces a better distribution of heat throughout the charge in the shaft than in any electric furnaces previously constructed.

The tuyéres are provided with sight holes, covered with mica, through which the interior surface of the arched roof can be observed. By means of this device, it is possible to determine approximately the necessary quantity of gas required to effectively cool the roof lining at the mouth of the melting chamber.

Each electrode was built up from two carbons 11 inches square by 63 inches long, making the total cross section of the built up electrode 11 inches by 22 inches. The electrode holder is made of a strong steel frame, forming a support for the wedges; by means of which the copper plates conducting the current from the copper cables are pressed against the faces of the electrode.

The electrode is clamped in the steel frame mentioned above, and slides on two guides; which serve the two-fold purpose of keeping the angle of inclination to the vertical, constant, and relieving the arched roof of any undue strain which would arise from the weight of the electrode—if insufficiently supported. A steel cable, secured to the top of the electrode holder and passing over a system of guide wheels or pulleys to the drum operated by the hand wheel on the switchboard, serves to lower and raise the electrode, by winding or unwinding the drum.

In order to protect the parts of the electrodes outside the furnace from the oxidizing action of the air, a suitable covering is provided.

The water-cooled stuffing boxes, through which the electrodes enter the melting chamber, are provided with special devices (not shown on the drawing) for preventing the gas under pressure within the melting chamber from leaking out around the electrodes.

The shaft—as previously mentioned —is supported by an iron plate, resting on six cast-iron pillars arranged sym-

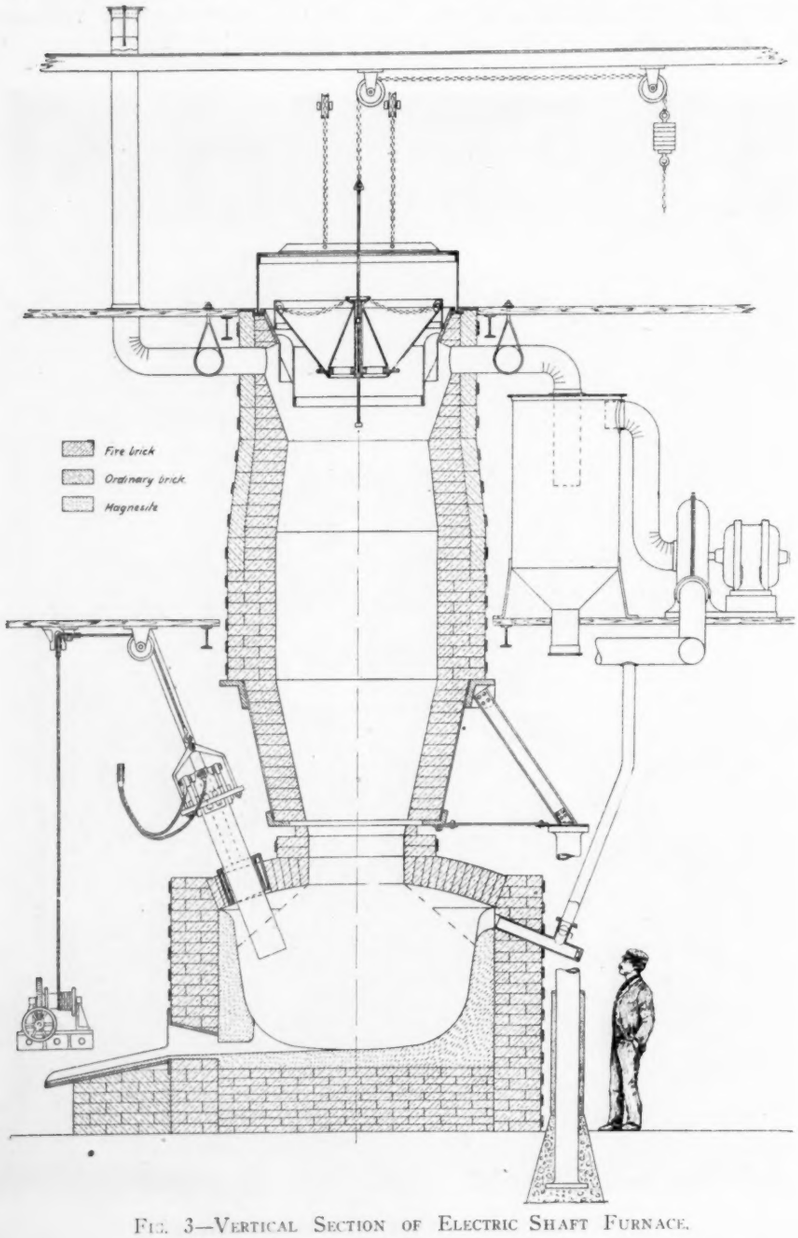


FIG. 3—VERTICAL SECTION OF ELECTRIC SHAFT FURNACE.

[3]During the run of the furnace now in progress (July 7) an examination of the tunnel-head gases was made, resulting as under:
The escaping gases were kept (by regulating the circulation) at a temperature of 200 degrees to 300 degrees; and the following is an analysis when using:

Hematite
- CO_2 .....40 per cent
- CO .....50 per cent
- H .....10 per cent

Magnetite
- CO_2 .....25 per cent
- CO .....65 per cent
- H .....10 per cent

metrically around the furnace hearth. To prevent the pillars from being cut off in the event of the molten iron accidentally finding its way to them, the lower parts are protected by sand enclosed in a sheet-iron casing.

This mode of construction enables the operator to repair or replace—without removing the shaft—those parts of the furnace needing the most frequent repairs, viz., the lower part of the shaft, and the melting chamber.

In order to collect the waste gases at the throat of the furnace—with the object of utilizing them economically for the purposes specified on page 536, and at the same time to protect the charcoal fuel from premature combustion—the top of the shaft is closed by an iron cover, fitted with a charging bell and hopper, covered in by means of a specially constructed

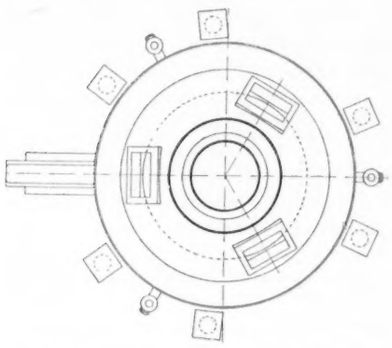


FIG. 4—PLAN OF SHAFT FURNACE.

sheet iron hood; designed to prevent gas explosions caused by the intrusion of atmospheric air into the shaft when a charge is being introduced.

The collected gases at the throat of the furnace are discharged into a down-comer pipe, provided with a dust-catcher, from which the gases—largely denuded of dust—are drawn by means of a fan, and forced down into the melting chamber through the three tuyéres.

With a view of preventing excessive pressure in the interior of the furnace, an uptake pipe—provided with loaded, self-closing valve—is placed at the junction of outlet pipe and top of downcomer, for conducting the gases generated in the furnace (when the pressure reaches a certain point) to apparatus designed for the utilization of the waste gases, or, to the atmosphere.

Raw Materials Used.

The iron ore placed at the disposal of the inventors for the trial run was magnetite from Grängesberg, and had the following composition:—

	Per cent.
Fe_3O_4	65.46
Fe_2O_3	21.21
MnO	0.30
MgO	0.98
CaO	3.84
Al_2O_3	1.07
SiO_2	3.16
P_2O_5	2.31
S	undetermined
Metallic iron	62.96

During the first part of the trial run, coke containing 85 per cent C and 0.55 per cent S was used. This, however, had been exposed for a long time to the open air and rain, which made its percentage of moisture unusually high. Lime was used as a flux.

The raw material—crushed to pieces of about 1 inch diameter—was conveyed to the charging floor of the furnace, where it was weighed, and charged by hand. The instruments were read every half hour, the product of each tapping carefully weighed, and samples of both the iron and slag taken for analysis. The iron and slag were tapped through the same hole; but no difficulty was encountered in separating the iron from the slag after cooling.

The men operating the furnace were divided into two shifts: each shift being of 12 hours duration, and consisting of four laborers and a foreman.

Heating of the Furnace.

Notwithstanding the fact that the furnace was new in every respect, only one week was allowed for heating from the time the first coke fire was lighted in the melting chamber to the time of the first tapping. Experience with blast furnaces has proved that at least three weeks should be devoted to the drying of the linings in furnaces of this size, prior to charging; otherwise, the heat energy which should be utilized in the reduction and dissociation of the ores will be expended in converting the moisture in the brick work into steam: resulting in the chilling of the iron, and consequent reduction of the output. The unavoidable neglect of this precaution in the present instance, interfered materially with the normal thermal working condition of the furnace throughout the entire trial—especially at the beginning—as the output tables clearly show.

Although the furnace was designed for a much larger capacity, the power available at this time was only 400 to 450 kilowatt. The tension was kept at between 40 and 50 volts, and the power factor—which, with the lower tension during the first part of the run, was 0.85—rose to 0.90 with the higher tension.

A point in the construction of this furnace deserving of special mention is, the almost complete absence of fluctuation in the instruments for recording the current and tension delivered. This, in former electric furnaces, occasioned a serious difficulty, and necessitated either the installation of automatic electrode regulators, or the constant presence of a man at the switchboard for adjustment and regulation. In this case, however, the only regulation required is that corresponding to the consumption of the electrodes, which requires to be done once a day, and sometimes for slightly longer periods. The cost of the electric installation for this furnace, compared with that of other types, is, therefore, cheaper; inasmuch as the costly apparatus for controlling the electrodes is dispensed with. Since the fluctuation of power is almost negligible, and current shocks do not have to be taken into consideration, this type of electric furnace constitutes an ideal load for a power station.

The Trial Run.

The trial run was started at 6:30 A. M., Dec. 27, when the readings of the different measuring instruments were taken and recorded every half hour. Samples of the pig iron and slag were taken for analysis; and the iron—after the slag had been entirely removed—carefully weighed.

During the first part of the trial the composition of the charge was:

	Pounds.
Ore	209.0
Coke	48.4
Lime	11.0

The coke used in this charge corresponds to a consumption of about 810 pounds per long ton pig iron. During tapping, however, carbon was observed to escape through the tap-hole with the slag, which, in addition, contained a considerable amount of carbide. This indicated an excess of carbon. The charge was, therefore, altered the next morning to the following composition:—

	Pounds.
Ore	209.0
Coke	42.0
Lime	4.4

corresponding to a consumption of carbon of about 704 pounds per long ton of pig iron.

On the evening of the same day the charge was again changed to:

	Pounds.
Ore	220.0
Coke	41.8
Lime	4.4

which corresponds to a consumption of carbon of about 671 pounds per long ton of pig iron.

The coke used up to this time was

very wet, having been exposed to rain and snow. As, however, dry coke, which consequently contained a higher percentage of carbon per unit weight, was now available, the charge was again changed to:

	Pounds.
Ore	220.0
Coke	37.4
Lime	4.4

which corresponds to a consumption of coke of about 605 pounds per ton of pig iron. This might be further reduced when the furnace is working normally, and the gases circulated as previously described. However, this consumption of carbon must be considered as extremely satisfactory.

Analyses of the pig iron from six different tappings, and of the slag from tapping No. 4, are given below. From an inspection of these analyses it will be seen that the sulphur content, especially in the last one, is exceedingly low. During the last tapping the temperature of the furnace was higher than in the former tappings, which accounts for the low sulphur content.

ANALYSES OF PIG IRON PRODUCED.

Cast No.	C	Si	Mn	P	S
2	3.20	0.056	0.32	1.80	0.015
3	3.20	0.103	0.37	1.50	[4]
4	3.40	0.065	0.34	1.64	0.015
5	3.20	0.075	0.32	1.80	[4]
9	3.20	0.075	0.39	1.93	0.015
13	3.15	0.070	0.24	2.06	0.005

ANALYSIS OF SLAG FROM CAST NO. 4.

SiO_2	26.54
CaO	54.48
S	0.78
Fe	0.35

The readings of the volts and amperes, and the consumption of energy, are given in the following table. As previously explained, *these figures cannot serve as a criterion for judging the process commercially,*[5] *and are only inserted here as they may be of some interest from a technical point of view.*

It may be pointed out that the output continued to steadily rise as the furnace more nearly approached its normal working condition—even with the inadequate power supplied—until an unfortunate accident occurred to one of the water-cooled stuffing boxes, necessitating the removal of one electrode.

Towards the end of the run, one of the cast iron, water-cooled stuffing boxes developed a bad crack, which allowed large quantities of water to escape into the furnace. This would not have occurred had sufficient time been allowed for the thorough testing of all the castings, and cannot happen in the future; since the design of these water-cooled stuffing boxes has been changed. But even while running with only two electrodes, the output again began to rise when the heat lost by the water escaping into the furnace was partially restored to the walls of the furnace, and to the wet charge in the shaft.

The time limit set by the director of the company for the delivery of power to the furnace, was January 1, 1909; it was necessary, therefore,

[4]Undetermined.

[5]For reasons, see paragraph headed "Heating of the Furnace."

ELECTRICAL MEASUREMENTS.

Date.	Time.	Amperes I.	Amperes II.	Amperes III.	Volts.	Kilowatts.	Remarks.
Dec. 27	6:30 a. m.	6,800	6,800	6,800	41	400	
Dec. 27	7:00 a. m.	6,800	6,800	7 000	42	415	
Dec. 27	7:30 a. m.	7,000	7,000	7,000	40	400	
Dec. 27	8:00 a. m.	7,000	7,000	7,000	41	405	
Dec. 27	8:30 a. m.	6 800	7,000	6,800	42	415	
Dec. 27	9:00 a. m.	7,000	7,000	7,000	40	400	
Dec. 27	9:30 a. m.	6,800	7,000	7.000	40	395	2 860 lb. of pig iron cast.
Dec. 27	10:00 a. m.	6,800	6,800	6,800	40	385	
Dec. 27	10:30 a. m.	7,000	7,000	7,000	40	400	
Dec. 27	11:00 a. m.	7,200	7,000	7,600	38	380	
Dec. 27	11:30 a. m.	7,200	7,000	7,200	38	375	
Dec. 27	12:00 a. m.	7,200	7,200	7,400	33	325	
Dec. 27	12:30 p. m.	7 200	7,200	7 400	39	390	
Dec. 27	1:00 p. m.	7,200	7,200	7,400	38	380	
Dec. 27	1:30 p. m.	7,200	7,600	7,200	36	360	
Dec. 27	2:00 p. m.	7,400	7,400	7,200	36	360	1,067 lb. of pig iron cast.
Dec. 27	2:30 p. m.	7,400	7,200	7,400	38	385	
Dec. 27	3:00 p. m.	7,200	7,200	7,200	40	400	
Dec. 27	3:30 p. m.	7 400	7,200	7,400	39	395	
Dec. 27	4:00 p. m.	7,400	7,400	7,600	40	415	
Dec. 27	4:30 p. m.	7,200	7,200	7,400	38	380	
Dec. 27	5:00 p. m.	7,200	7,200	7,400	40	405	
Dec. 27	5:30 p. m.	.....	.....	.....	..	...	Power off, due to change
Dec. 27	6:00 p. m.	.....	.....	.....	..	...	on switchboard wiring.
Dec. 27	6:30 p. m.	.....	.....	.....	..	...	
Dec. 27	7:00 p. m.	6,200	6,400	6,600	42	380	
Dec. 27	7:30 p. m.	6 600	6 800	7 000	40	380	
Dec. 27	8:00 p. m.	6,800	7,000	7,000	40	385	
Dec. 27	8:30 p. m.	7 200	7,200	7,000	36	350	1,441 lb. of pig iron cast.
Dec. 27	9:00 p. m.	7,200	7,200	7,000	36	350	
Dec. 27	9:30 p. m.	7,400	7,400	7,400	36	365	
Dec. 27	10:00 p. m.	7,400	7,400	7,400	36	365	
Dec. 27	10:30 p. m.	7,400	7 400	7,200	37	370	
Dec. 27	11:00 p. m.	7,200	7,400	7.200	36	355	
Dec. 27	11:30 p. m.	7,200	7,400	7,000	36	350	
Dec. 27	12:00 p. m.	7,200	7 400	7,000	36	350	
Dec. 28	12:30 a. m.	7,000	7,400	6,800	40	395	
Dec. 28	1:00 a. m.	7,000	7,400	7,000	40	400	
Dec. 28	1:30 a. m.	7,000	7,400	7,000	40	400	
Dec. 28	2:00 a. m.	7 000	7,400	6 800	40	395	1,650 lb. of pig iron cast.
Dec. 28	2:30 a. m.	7,000	7,400	7,000	40	400	
Dec. 28	3:00 a. m.	7,000	7,200	7,000	38	375	
Dec. 28	3:30 a. m.	6,800	7,400	7,000	39	385	
Dec. 28	4:00 a. m.	6,800	7,200	6,800	39	375	
Dec. 28	4:30 a. m.	7,000	7 400	7 200	36	355	
Dec. 28	5:00 a. m.	7,200	7,400	7,200	36	355	
Dec. 28	5:30 a. m.	7,400	7,400	7,600	37	380	
Dec. 28	6:00 a. m.	7,200	7,200	7,400	36	360	
Dec. 28	6:30 a. m.	7,200	7,400	7,400	38	385	
Dec. 28	7:00 a. m.	7,200	7 400	7,400	38	385	
Dec. 28	7:30 a. m.	7 400	7,600	7 600	36	370	
Dec. 28	8:00 a. m.	7 400	7,400	7,600	36	365	1,870 lb. of pig iron cast.
Dec. 28	8:30 a. m.	7,400	7,400	7,400	38	385	
Dec. 28	9:00 a. m.	7,200	7,200	7,400	38	380	
Dec. 28	9:30 a. m.	7,400	7,400	7,400	36	365	
Dec. 28	10:00 a. m.	7,200	7,200	7 200	38	375	
Dec. 28	10:30 a. m.	7,200	7 400	7,400	38	385	
Dec. 28	11:00 a. m.	7 400	7,400	7,400	36	365	
Dec. 28	11:30 a. m.	7,400	7 400	7,600	38	390	
Dec. 28	12:00 a. m.	7,400	7,600	7,800	38	400	
Dec. 28	12:30 p. m.	7,600	7,800	7,600	40	430	
Dec. 28	1:00 p. m.	7,600	7,600	7 800	38	400	
Dec. 28	1:30 p. m.	7,600	7 400	7,600	38	395	
Dec. 28	2:00 p. m.	7 600	7,400	7,600	38	395	
Dec. 28	2:30 p. m.	7,600	7 600	7,400	40	425	
Dec. 28	3:00 p. m.	7 200	7,400	7,600	36	365	
Dec. 28	3:30 p. m.	7,200	7,600	7,400	38	385	
Dec. 28	4:00 p. m.	7,200	7,200	7 400	40	405	
Dec. 28	4:30 p. m.	7,400	7,400	7,800	38	395	
Dec. 28	5:00 p. m.	7,400	7,400	7,800	40	425	
Dec. 28	5:30 p. m.	7,400	7 400	7,600	40	415	1 420 lb. of pig iron cast.
Dec. 28	6:00 p. m.	7,400	7,400	7,600	42	440	
Dec. 28	6:30 p. m.	7 200	7,200	7,600	40	410	
Dec. 28	7:00 p. m.	7,200	7 200	7,400	40	405	
Dec. 28	7:30 p. m.	7,200	7,400	7,400	40	410	
Dec. 28	8:00 p. m.	7,200	7,400	7,200	38	380	
Dec. 28	8:30 u. m.	7 400	7 400	7,600	38	390	
Dec. 28	9:00 p. m.	7 200	7,200	7,600	38	385	
Dec. 28	9:30 p. m.	7,000	7,400	7,400	38	380	
Dec. 28	10:00 p. m.	7,200	7 200	7,600	37	370	
Dec. 28	10:30 p. m.	7 400	7,400	7,400	38	380	
Dec. 28	11:00 p. m.	7,200	7,600	7,600	38	390	2,343 lb. of pig iron cast.
Dec. 28	11:30 p. m.	7,200	7,600	7 400	38	385	
Dec. 28	12:00 p. m.	7 400	7,200	7,400	39	395	
Dec. 29	12:30 a. m.	7 400	7,200	7,600	39	400	
Dec. 29	1:00 a. m.	7,600	7,400	7 800	39	410	
Dec. 29	1:30 a. m.	7,400	7,400	7,600	39	405	
Dec. 29	2:00 a. m.	7 400	7,400	7,600	38	390	
Dec. 29	2:30 a. m.	7,600	7,400	7 600	38	395	
Dec. 29	3:00 a. m.	7,400	7,400	7,600	38	390	
Dec. 29	3:30 a. m.	7,600	7 200	7,600	37	380	
Dec. 29	4:00 a. m.	7,800	7 800	8 000	37	400	
Dec. 29	4:30 a. m.	7,800	7,600	7,800	36	380	
Dec. 29	5:00 a. m.	7,800	7,600	7,800	36	380	1,562 lb. of pig iron cast.
Dec. 29	5:30 a. m.	7 800	7 400	7,800	36	375	
Dec. 29	6:00 a. m.	7,800	7,400	7,800	35	365	

that the latest charge in the furnace should be all melted down, and tapped out, prior to that date. This was accordingly anticipated, and the official trial run was discontinued at 6 A. M., Dec. 29, 1908.

In the following table is given the number of tons of pig iron produced per electrical horsepower year, in casts Nos. 2 to 10, inclusive:

Cast No.	Tons of pig iron per E. H. P. year.
2	0.744
3	1.870
4	2.180
5	2.360
6	2.440
7	1.120*
8	3.160
9	1.950
10	1.030

*Electrode holder began to leak badly.

From the foregoing tables it will be seen that the output before the leakage of water into the furnace became serious, was 2.44 metric tons per electrical horsepower year. This figure—considering the disadvantages[6] under which the trial run was made—may be deemed very satisfactory.

Owing to the short duration of the trial, it was impossible to determine the consumption of electrodes per ton of pig iron produced. According to former tests, however, this may be placed at about 5 Kgs. per metric ton (2,204 pounds) of pig iron produced.

Technical Objective of Trial Run.

The trial run was intended to elucidate the following points:

(1) Whether undisturbed and uniform working without troublesome regulation of the electrodes could be obtained.

(2) Whether great variations in the consumption of energy would occur.

(3) Whether the free spaces within the melting chamber would be maintained with a shaft considerably higher than in the furnaces of earlier design and construction.

(4) Whether the contraction of the shaft would prevent the charge from sinking uniformly, or cause hanging.

(5) The durability of the arched roof, and the possibility of cooling it by means of the circulating gas.

Deductions from Observation.

The following is a summarized statement of practical deductions drawn from observations made during the trial run: having regard to the objective points specified above:

(a) It was observed that the furnace operated uniformly and without trouble of any kind, and that the electrodes required absolutely no regulation, in one case, for five consecutive days. In any case, the only regulation required is that corresponding to the consumption of the electrodes, and is necessary only once a day, and sometimes not for much longer periods. On account of this, expensive regulation can be dispensed with.

(b) During the short trial, even though the furnace did not approach its normal working condition until towards the end it was observed that the consumption of energy was remarkably uniform. This can readily be seen from an inspection of the readings of the different instruments.

(c) Free spaces were maintained between the linings of the roof and walls, and the electrodes and charge at the openings where the electrodes enter the melting chamber.

(d) It was found that the charge did not jam in the lower contracted neck of the shaft, as had been feared, but moved with regularity into the melting chamber.

(e) Although the gases generated by the reduction of the ore were not circulated through the cooling tuyeres until near the end of the trial run, it was demonstrated that the lining of the roof of the melting chamber was effectively cooled by this means.

[6]Water leaked into the furnace in small quantities from the beginning of the trial, but was not so noticeable until after the seventh cast.

Comparison of Costs.

Prof. von Odelstierna, Stockholm, makes the following comparison of cost of production of pig iron in the charcoal blast furnace with that produced in the electric shaft furnace, based on conditions in Sweden.

"If we take as a basis for our comparative study, an ordinary charcoal blast furnace, and the electric shaft furnace erected at Domnarfvet: and suppose the iron ore used in these furnaces to contain 60 per cent metallic iron, and the charcoal 83 per cent carbon, then it should be possible to make a reliable comparison. It should be pointed out, however, that in this comparison no account is taken of the fact that, the gases produced in the electric shaft furnace contain a higher percentage of CO—probably 60 per cent more—than the ordinary blast furnace gases.

In regard to the labor charges and general expenses, I make the supposition that these charges are the same for both the electric shaft furnace and the charcoal blast furnace, if the contrasted furnaces are of such capacity as to produce the same quantity of pig iron per year. A charcoal blast furnace of medium capacity produces in Sweden about 8,000 to 10,000 short tons of pig iron per annum—a quantity which I believe can also be produced in a properly constructed electric shaft furnace of the type of Aktiebolaget Electrometall.

COST OF PIG IRON PER SHORT TON IN DOLLARS.

Charcoal Blast Furnace.		Electric Shaft Furnace.	
Charcoal, 0.95 ton at $8 per ton	$ 7.60	0.27 ton	$ 2.16
Electrical energy	0.00	0.3 E. H. P. year at $12	3.60
Labor	1.00		1.00
Electrodes	0 00	10 lb. at 3c per lb	0.30
Repairs and general expenses	1.50		1.50
	$10.10		$ 8.56

In this calculation the price of ore and limestone, and the royalty are not given, as the former varies with the locality and the character of the ore, and the latter has not yet been determined.

From this calculation it is apparent that in Sweden, under the above-mentioned circumstances, a saving of $1.55 should be effected in the production of pig iron by the electro-thermic process.

A GROWING CONCERN.

The business of the Jonathan Bartley Crucible Co., Trenton, N. J., has increased to such an extent that it will be necessary to erect another kiln and build an extension to its plant. The company has been in business only one year and has made very satisfactory progress. Samuel H. Dougherty, for many years sales manager of the Joseph Dixon Crucible Co., has severed his connection with that company and is now associated with the Jonathan Bartley Crucible Co. as its western representative.

PUBLICATIONS RECEIVED.

DICTIONARY OF CHEMICAL AND METALLURGICAL MATERIAL.—182 4½ x 7½-inch pages; published by Electrochemical & Metallurgical Industry, 239 West Thirty-ninth street, New York City. Price 50 cents.

DRILL GRINDING.—Reprint of shop operation sheet No. 100 and 101 by the Industrial Press; distributed by the Cleveland Twist Drill Co., Cleveland, O., gratis.

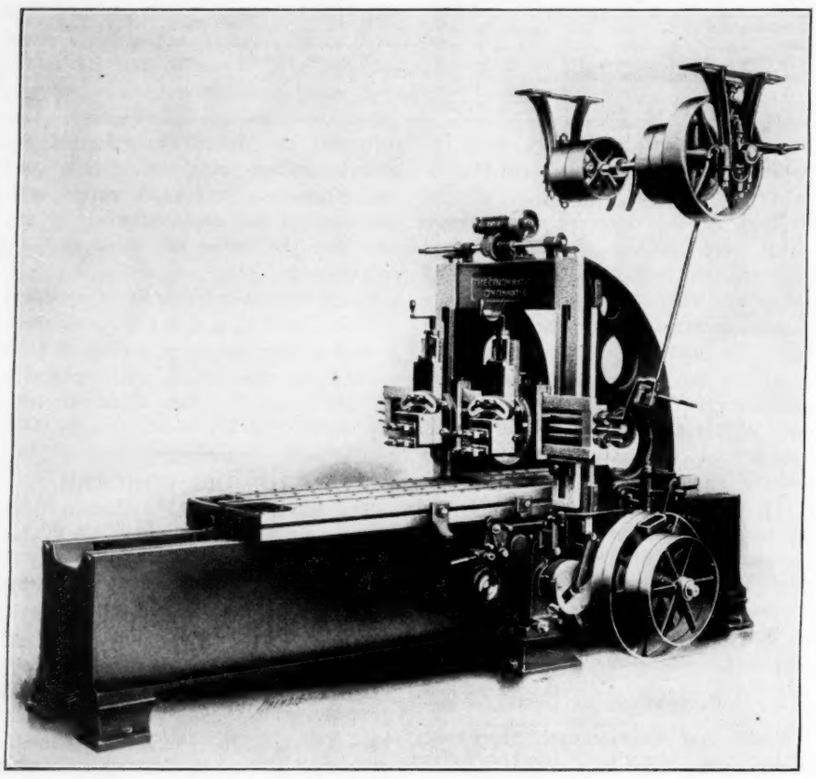
PRODUCTION OF PETROLEUM IN 1908.—Advance chapter from Mineral Resources of the United States for 1908, by David T. Day; 100 pages; distributed by the United States Geological Survey.

REPORT ON THE INVESTIGATION OF AN ELECTRIC SHAFT FURNACE.—By Eugene Haanel, Ph. D., Director of Mines, Canada; distributed by the Canadian Department of Mines, Ottawa.

CINCINNATI PLANER WITH TWO SPEED DRIVE.

As it frequently happens that additional or variable speeds would greatly add to the usefulness of a planer, the Cincinnati Planer Co., Cincinnati, has developed the two-speed drive shown in the illustration herewith, giving two cutting speeds to the table and a constant return. Any two cutting speeds wanted can be provided with this drive, and the changing from one speed to the other is accomplished instantly while the machine is running.

The drive consists of two sets of pulleys, one keyed to the shaft and the other a wide-faced pulley running loose



CINCINNATI PLANER WITH TWO-SPEED DRIVE.

on the shaft. Both are driven by independent belts from the line shaft and run at different speeds. In addition the usual extra heavy return pulley and the cutting pulley, both keyed to the shaft and adjoining the wide-faced pulley, are fitted. By operating the lever shown at the side of the housing the two speeds are obtained; the high speed by moving the belt to the right on to the cutting pulley, and the low speed by moving the belt to the left onto the wide-faced pulley. The return belt remains in one position giving a constant return of table. The makers advise its use on all planers up to 36 inches; above that size they recommend the use of the speed box.

THE PRODUCTION OF PETROLEUM.

Petroleum is so intimately associated with the iron and steel industries as a fuel in open-hearth furnaces, rolling mills, forges, annealing and tempering furnaces, etc., that statistics of its production, distribution and value are necessarily of importance.

In an advance chapter from the Mineral Resources of the United States for 1908, issued by the United States geological survey, and bearing the above title, David T. Day gives an exhaustive report on every phase of the petroleum industry, with the production of the different states and fields and the value thereof, dating from 1859. A map accompanies the work, showing the location and approximate known areas of the oil and gas fields so far discovered.

Production and Value.

In the introduction the author states that the great gain in production of petroleum in 1907 over 1906 required such a drain on all the great pools and developed so large a stock of unused crude oil that a further increase in 1908 was not probable as a matter either of trade requirements or of available petroleum resources. As the year 1908 went on, unprecedented floods in May and June, and again in November, brought disaster to the pipe lines of Oklahoma; and these storms also left a record of over 100 oil tanks destroyed by lightning. In the eastern fields, on the other hand, the severe drought seriously interfered with well drilling. The decline in production in the Glenn pool and in various Texas and Louisiana pools increased the likelihood of a total smaller than in 1907. Nevertheless, the actual record of the year shows a total beyond all records, 179,572,479 barrels,[a] compared with 166,095,335 barrels in 1907, or 8.11 per cent increase. The total value was proportionately great, viz., $129,706,258, as against $120,106,749 in 1907. The price of the product in California increased, and it remained steady in other fields, except in the Gulf field, where a comparatively groundless fear of overproduction from the new Markham and Goose Creek districts caused depression.

The increases came from the steady growth in Illinois and California. Neither field showed phenomenal development. California responded to the higher prices consistent with depleted stocks, and Illinois showed the continued effect of the great investments of 1907 in this new territory.

The year, however, had its sensations. They came in midsummer. On July 2, a large gusher was drilled in at Goose Creek, Harris county, Tex., and three days later a gusher of the Spindle Top type came in at Markham, in Matagorda county. This turned the attention of the oil producers in the Gulf field significantly farther south.

July 4, 1908, proved memorable in three widely separated regions. At Anse la Butte, La., a large gusher, known as "Lake No. 9," was drilled in. On the same day the Pearsons opened in Mexico a well that assumed the proportions of a volcano and made a new world's record for an outburst of oil and water. On the same day also the Oil City well at Tustanowicz produced the record spouter for the Galicia field in Austria.

Oklahoma led all the states in production, with a total of 45,798,765 barrels, an increase of 5.23 per cent over 24,281,973 barrels in 1907 to 33,685,106 barrels in 1908, a gain of 9,403,133 barrels, or 38.72 per cent. Colorado, Louisiana, Michigan, Missouri, Utah, Wyoming and West Virginia also showed gains in production. The declines were in Indiana, where it was nearly 36 per cent; Kansas, 25 per cent; Ohio, 11 per cent; Texas, 9 per cent; Pennsylvania, nearly 6 per cent; New York, 4.3 per cent; and Kentucky, 11 per cent.

[a]The barrel used in this report unless otherwise specified, is the United States standard barrel containing 42 Winchester gallons.

The increased activity in the three great fields—California, Oklahoma and Illinois—was the dominant feature of the situation rather than the discovery and opening of any considerable new fields. The principal new field to gain prominence was the Caddo pool in northwestern Louisiana. The hoped-for increase in production from the Markham and Goose Creek fields in Texas did not materialize, and the total from the state showed a decline in spite of the increased production in the Humble pool. In the Appalachian field 7,115 new wells were drilled, of which 5,292 were producers, with a total initial production of 55,002 barrels. In the Lima-Indiana region 1,250 new wells were drilled, of which 1,088 were producers. In the new Illinois field 3,574 wells were drilled, of which 3,019 were producers, with an average initial production of 26 barrels a well. In the mid-continent field 3,490 wells were drilled, of which 2,587 were producers of oil, 471 were producers of gas, and 432 were dry; the initial production of the producing wells averaged 83.7 barrels. In the Gulf field only 819 new wells were drilled, 606 being producers and showing an initial production of 297 barrels. In California 617 wells were drilled, of which 594 were productive; and in other parts of the country 44 wells were drilled, yielding 24 new producers. From the total of 13,210 productive wells drilled the average initial production was 42.9 barrels.

The average price of petroleum for the entire country in 1908 remained identical with that in 1907, but there were considerable variations of an important character in individual states. The most notable of these was the increase in price in California from 37 cents a barrel in 1907 to 52¼ cents a barrel in 1908. The Gulf states, Louisiana and Texas, showed a decline in value from a little over 80 cents to 60 cents. The Appalachian oil showed a slight increase in value, from $1.73 in 1907 to $1.76 in 1908.

On the whole, prices were remarkably steady considering the notable increase over the large production of 1907.

The elasticity of the American oil trade is shown by the fact that stocks did not increase as much as might have been expected from the great production. The preparations of the year before led to better ability to transport the product to points of consumption.

During the year 1908 a study was was made[b] of the stock of petroleum in the known fields of the United States, and from this estimated total supply the probable duration of the oil fields was calculated from the present increasing rate of production. It was shown that in each nine years as much petroleum was produced as in all preceding years. The enormous production of the last two years is at a still greater rate than that required to keep up this ratio of increase; in fact, the production of the last eight years is almost equal to all the preceding product since the beginning of the industry. In all nearly 2,000,000,000 barrels have been produced in 49 years, worth one and three-fourths billion dollars. This is more than half the value of all our gold and more than the entire value of our silver produced in twice as many years. The value of the petroleum in 1908 exceeded the value of the gold and silver combined by over $2,000,000.

[b]Report of the National Conservation Commission. Petroleum was the sixth largest contributor to our mineral wealth and furnished about one-sixteenth of the entire value.

Production.

The statement of production by states is given in the following table:

TOTAL QUANTITY AND VALUE OF CRUDE PETROLEUM PRODUCED IN THE UNITED STATES AND THE AVERAGE PRICE PER BARREL IN 1907 AND 1908, BY STATES.

State.	1907 Quantity, barrels.	1907 Value.	1907 Average price per barrel.	1908 Quantity, barrels.	1908 Value.	1908 Average price per barrel.
California	39 748,375	$ 14,699 956	$0.370	44,854,737	$ 23,433,502	$0.5225
Colorado	331,851	272,813	0.822	379,653	346,403	0.913
Illinois	24,281,973	16,432,947	0.677	33 685,106	22 648,781	0.672
Indiana	5,128,037	4,536,930	0.885	3 283,629	3,203 883	0.976
Kansas	2,409,521	965,134	0.401	1,801 781	746,635	0 414
Kentucky and Tennessee[c]	820,844	862 396	1.051	727,767	705,811	0 971
Louisiana	5 000,221	4,063,033	0 813	6,835,130	4 131,173	0 604
Michigan and Missouri	4,000	6,500	1.625	15,246	22,345	1.466
New York	1,212,300	2 127,748	1.755	1,160 128	2,071,533	1.7856
Ohio	12 207,448	14,769,888	1.210	10 858,797	14,178,502	1.306
Oklahoma	43,524,128	17.513,524	0.402	45,798 765	17,694.843	0.386
Pennsylvania	9,999.306	17 579,706	1.758	9,424 325	16 881,194	1 7912
Texas	12,322 696	10,401,863	0 844	11 206,464	6,700.708	0 598
Utah and Wyoming	9 339	21 883	2.343	17,775	27.900	1.57
West Virginia	9 095,296	15,852,428	1.743	9,523,176	16,911,865	1.776
	166 095,335	$120,106,749	$0.723	179,572,479	$129 705,258	$0.722

[c]No production in Tennessee recorded in 1908.

The increase or decrease in the production by states, as well as the percentage of increase or decrease in 1908, compared with 1907, are shown in the following table. The striking features were the increases in quantity and in percentage in California and Illinois, and also the great percentage of decline in Indiana and Kansas.

TOTAL PRODUCTION OF CRUDE PETROLEUM AND PERCENTAGE OF INCREASE OR DECREASE, BY STATES, IN 1908, COMPARED WITH 1907, IN BARRELS.

State.	Production 1907.	Production 1908.	Increase.	Decrease.	Percentage Increase.	Percentage Decrease.
California	39,748,375	44,854,737	5,106,362	.....	12.85	.....
Colorado	331,851	379,653	47,802	.....	14 40	.....
Illinois	24,281,973	33,685,106	9,403 133	.....	38.72	.....
Indiana	5,128 037	3,283,629	.....	1 844,408	.....	35.97
Kansas	2,409,521	1,801,781	.....	607,740	.....	25.22
Kentucky and Tennessee[d]	820,844	727,767	.....	93 077	.....	11.34
Louisiana	5 000,221	6 835,130	1,834,909	.....	36.70	.....
Michigan and Missouri	4,000	15 246	11 246	.....	281.15	.....
New York	1,212.300	1 160 128	.....	52,172	.....	4.30
Ohio	12,207 448	10,858 797	.....	1,348,651	.....	11.05
Oklahoma	43,524,128	45,798,765	2,274,637	.....	5.23	.....
Pennsylvania	9,999,306	9 424,325	.....	574 981	.....	5.75
Texas	12,322,696	11,206 464	.....	1,116,232	.....	9.06
Utah and Wyoming	9 339	17 775	8 436	.....	90 33	.....
West Virginia	9,095,296	9,523,176	427 880	.....	4.70	.....
	166,095 335	179,572,479	13,477.144	.....	8.114	.....

[d]No production in Tennessee recorded in 1908.

In addition to the statistics for the United States, condensed information regarding the other oil fields of the world are included and the deduction is inevitable that as industrial requirements expand the development of new fields and extension of old keep pace with them.

ELECTRIC SMELTING OF IRON ORES.

As a sequence to the reports on Electric Smelting of Iron Ores published in 1904, 1906 and 1907, the mines branch of the department of mines of Canada has just issued the results of "An Investigation of an Electric Shaft Furnace" in operation at Domnarfvet, Sweden. The investigation was made by Dr. Eugene Haanel in December, 1908, on the invitation of the inventors, and the results given represent the latest developments of the electric smelting of iron ores.

The report contains 38 pages and is divided into four parts. Part 1 deals with the Domnarfvet furnace, the trial runs witnessed by the writer of the report and the comparative costs of production of pig iron by the furnace. The other three parts, which are more of the nature of appendices, describe: (1) a new electric furnace for the manufacture of steel, (2) the manufacture of electrodes, (3) methods of

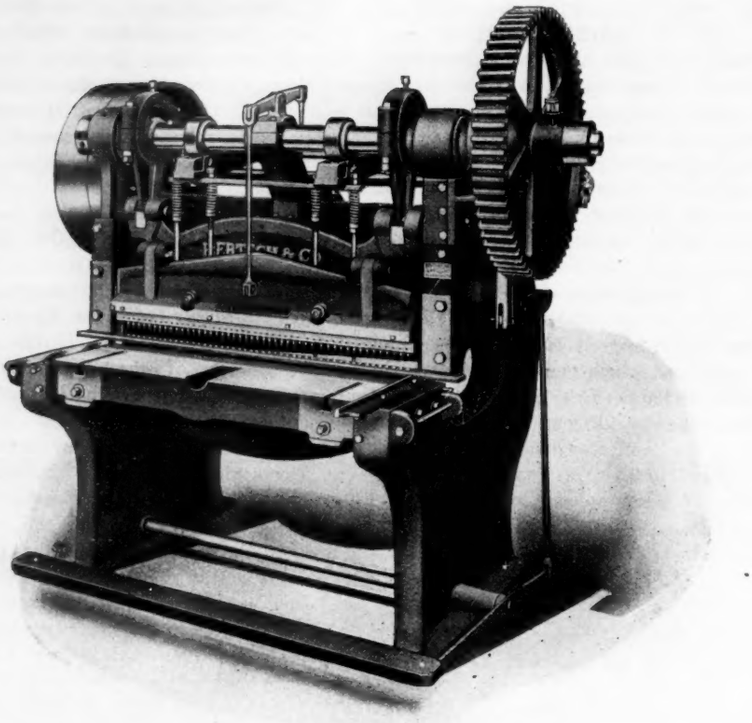


FIG. 1—PUNCH CROSSHEAD LOCKED FOR PUNCHING.

manufacturing wood charcoal, this material being used to supply the carbon which enters into the composition of pig iron manufactured by electric smelting.

Three full page plates, from photographs, and numerous drawings, illustrate clearly the descriptive matter of the book, which, taken in conjunction with the reports previously published by the mines branch on the subject of electric smelting, brings up to date the literature on the electrometallurgy of iron.

"The Report on the Investigation of an Electric Shaft Furnace" at Domnarfvet, Sweden, may be obtained on application to Dr. Eugene Haanel, director of mines, department of mines of Canada, Ottawa.

NEW COMBINED SQUARING SHEAR AND MULTIPLE PUNCH.

We present herewith illustrations of a combined squaring shear and multiple punch, which has just been brought out by Bertsch & Co., Cambridge City, Ind. These machines are designed to be used either as a shear or as a combined punch and shear for punching a series of holes simultaneously with the shearing operation. The machines are built with the distance from punch centers to the edge of blade from ½ inch to 5 inches, as specified. The punches have either independent or universal adjustment. For the latter they are set in an adjustable dove-tailed punch-holder bar, so that the entire set may be either adjusted together or entirely removed.

Fig. 1 shows the machine with the punch crosshead in position for punching simultaneously with the shearing stroke, while Fig. 2 shows the punch crosshead swung up out of the way, converting the machine into a plain gap shear. By removing the upper shear blade the machine can be used as a regular multiple punch, and a series of holes can then be punched along any line in the sheet. The vertical rods, shown most clearly in Fig. 2, serve as a hold-down when the machine is used as a plain shear, and as strippers when used as combined punch and shear. The number of these depends upon the character of the work to be done on the machine, and they are actuated by a bar in the rear of the punch crosshead. For some kinds of work a solid bar the full length of the machine is carried on the lower ends of these stripper rods.

The machines will be built in all necessary sizes from 3 feet up to 12 feet, and for dealing with material up to ½ inch in thickness, and with either motor or belt drive.

Following a meeting of the board of directors of the Missouri, Kansas & Texas railroad in St. Louis, Sept. 13, it was announced that the road would spend $4,000,000 on freight terminals in that city. Two hundred acres have been secured and work is to begin at once.

Fleeman, Brown & Co., engineers, have opened offices at 220 Sherlock building, Portland, Ore. They will make a specialty of designing and installing power plants, mills and electric plants. Both Mr. Fleeman and Mr. Brown go to Portland from Ogden, Utah.

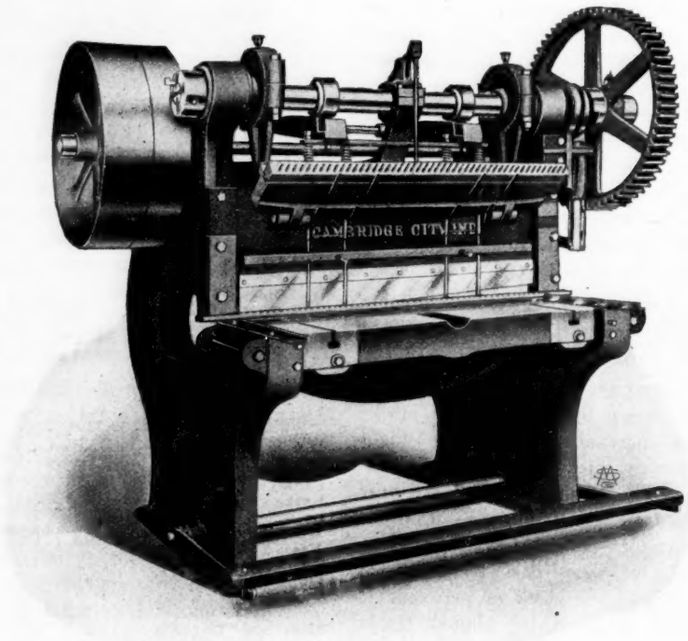


FIG. 2—MACHINE AS USED FOR PLAIN SHEAR.

AN INDIAN IRON AND STEEL PLANT

Tata Iron and Steel Company, Limited.
Sakchi, via Kalimati, B-N. Rly., Bengal, India.

The firm of Tata, Sons & Co., Bombay, founded by the late manufacturer and merchant, Jamsetjee Tata, and now controlled by his sons, organized and incorporated in 1907 the Tata Iron & Steel Co., Ltd., for the purpose of converting the raw materials of India into iron and steel products, for which the country offered an extensive and rapidly growing market.

The company is entirely an Indian enterprise, with a native Indian board of directors, and some 7,000 individual shareholders. The initial share capital is £1,545,000, sterling. The first chairman of the board of directors was D. J. Tata, who is also the head of the firm of Tata, Sons & Co., the agents of the steel company; since his absence in Europe, R. J. Tata, of the same firm, has been the chairman.

The other members of the board are: H. H. The Thakore Saheb of Morvie, G. C. I. E.; Sir Sassoon David, Kt. (of Messrs. Sassoon J. David & Co.); Sir Cowasji Jehangir, Bart. (of Sir J. Cowasji Jehangir & Co.); The Hon. Sir Vithaldas D. Thackersey, Kt. (of Messrs. Thackersey, Mulji & Co.); Gordhandas Khattau (of Messrs. Khattau, Mackanji & Co.); Fazulbhoy C. Ebrahim (of Messrs. Currimbhoy, Ebrahim & Co.); Narottam M. Goouldas (of Messrs. Morarji, Goouldas & Co.); P. D. Pattani (Dewan of Bhavangar State) and A. J. Bilimoria (of Messrs. Tata, Sons & Co.).

Robert Goss Wells, lately of the Youngstown Sheet & Tube Co., Youngstown, O., U. S. A., is the general manager of the company. Mr. Wells joined duty in January last, with headquarters at Sakchi.

Under the direction of the consulting engineer, C. P. Perin, of New York, extensive investigation of the natural resources of the central portion of India had been previously undertaken, resulting in the securing for the new company of the following valuable deposits of raw materials:

1. *Iron Ore.* In the states of Mayurbhanja, Orissa, distant about 200 miles form the port of Calcutta, three large beds of hematite iron ore have been discovered, of which only the one at Gurumaishini will at present be exploited. In this one locality, there are in sight some 20,000,000 tons of ore on various ridges, analyzing as follows:

	Iron. Per ct.	Silica. Per ct.	Sulphur. Per ct.	Phosphorus. Per ct.
The Sundal ridge...	63.57	2.60	0.023	0.028
The Rangamatia ridge	59.20	4.10	0.014	0.087
The Tuila ridge (solid ore body).....	66.13	1.17	0.016	0.054
East of Rangamatia (solid mass)	67.60	0.60	0.038	0.017

Gurumaishini is situated some 40 miles from the new works, and will be connected with the works by a broad-gage railway, now being constructed by the Indian government. Two other deposits of similar character are located a few miles beyond the present terminus of the new mineral railway. The company possesses also considerable deposits of iron ore at Dhullee, in the Raipur district. Though this ore is even richer, containing about 67 per cent of iron, while the phosphorus comes well within the Bessemer limit, the advantage in freight makes it advisable to begin exploitation in the Gurumaishini field.

2. *Fuel.* The company has purchased a large area of coal land in the eastern part of the Jherria field. The coal produces a hard, strong coke, suitable for metallurgical purposes, low in sulphur and having an average ash content of about 18 per cent. The coal property is about 100 miles from the works.

3. *Flux.* The company will have flux for the blast furnaces, in two forms—calcite and dolmite.

4. *Manganese. Ore.* The company owns manganese mines of considerable importance, in the neighborhood of Nagpur. The ore contains about 50 per cent of manganese.

It can be stated, therefore, that the new steel company controls for practical purposes an unlimited supply of the four necessary raw materials: iron ore, coking coal, flux and manganese ore. To utilize these, it was decided to construct an up-to-date iron and steel plant of a yearly capacity of 120,000 tons of foundry iron, rails, shapes and merchant bars. The Indian government granted a special freight rate of 0.15 penny per ton-mile for raw materials, supplies and finished products. They placed with the new company an order for 200,000 tons of rails, for periodical delivery, and undertook to construct a broad-gage railway to connect the works with the Mayurbhanja iron ore mines. Twenty-three square miles of land were secured, partly in fee and partly on long lease, the land being located alongside of the Bengal-Nagpur railway, near Kalimati, 152 miles west from Calcutta. At this point the combined freight charges for raw materials, supplies and export products were found to be the most advantageous. The climate at the site is healthy. The elevation of the works is about 535 feet above sea-level, and the natural drainage is perfect. The ground for foundations consists of impervious and fireproof mica schist, uniformly found at a depth of from 4 to 6 feet below the surface. The property is bounded on the north and west by the Subernarekha and Kharkhai rivers, from which a sufficient supply of water is obtained. A concrete weir, about 1,200 feet long, has been thrown across the former river, and a reservoir 47 feet deep, with an area of about 60 acres is now being constructed, into which water will be delivered from the river pumping station through a 30-inch welded steel pipe 9,300 feet in length. A town, arranged for a population of 20,000 Europeans and Indians, is being constructed. More than 100 bungalows are now under roof or above ground. The town and works sites are connected with the Bengal-Nagpur railway by a broad-gage (5 feet 6 inches) railway 3 miles long. Large receiving yards are being constructed at Kalimati by the railroad.

Julian Kennedy, Sahlin & Co., Ltd., of Pittsburg and Brussels, have been engaged as constructing engineers and designers for the works, which are shown by our illustration. This plant is being planned in the most substantial and durable manner, and with due regard to the progress of the art and to the necessity of furnishing a simple and easily-worked installation for this new and distant industrial territory.

Coke Oven Plant.

The coke oven plant consists of 180 non-by-product coke ovens, fitted with a coal breaking and crushing plant for a capacity of 700 tons per 10 hours, coal storage bin, electric charging larries and electrically-driven coke pushers and levellers. The coke is carried on steel trucks from the coke ovens to the blast furnace charging pockets.

Blast Furnaces.

There are two blast furnaces 19 feet in diameter by 77 feet high, each

equipped with inclined double skip hoist, automatic stock pockets served by electric charging larries, four 22 feet x 90 feet central combustion chamber Cowper-Kennedy hot-blast stoves, dust-catchers and centrifugal gas cleaners. The iron can either be run liquid into ladles, or cast into pigs. The slag is removed in self-emptying slag cars.

Boilers.

The available gas from the blast furnaces, supplemented by hand coal-firing, will be used in a central boiler plant, consisting of 8,000 horsepower Babcock & Wilcox boilers.

Blowing Engines.

Each blast furnace will be blown by one out of three Zoelly type turbo blowers, having a capacity of 30,000 atmospheric cubic feet of blast per minute against a pressure of 18 pounds per square inch. The turbo-blowers are equipped with separate surface condensers.

Electric Boiler Plant.

This consists of three 1,000-kilowatt turbo generators, direct-coupled to Zoelly type turbines, with surface condensers. The dynamos generate three-phase current, 3,000 volts, 50 periods. Part of this energy is transformed by two motor generators into 250 volt direct current, to be used for cranes and in the rolling mill plant. Another part is cut down by stationary transformers to a tension of 440 volts, and distributed throughout the works. Still another part is carried at high tension to the river pumping station, about 2 miles from the works.

Pumping Plant.

This plant consists throughout of centrifugal type pumps for the distribution of water throughout the works, for hydraulic pressure, boiler feed, filters and town service. The whole of the blowing, generating and pumping machinery is concentrated in one central power plant, located alongside the boiler plant.

Steel Plant.

This is located in a building 650 feet x 135 feet containing one 300-ton gas-fired mixer, resting in cradles; four 40-ton basic open-hearth furnaces, and three five-hole gas-fired soaking pits. All the furnaces are equipped with Dyblie water-cooled reversing valves.

The metal is brought in ladles from the blast furnace plant, and is poured into the mixer by one of the two 75-ton casting cranes. The ingots are cast in molds standing on trucks. At the east end of the steel plant is located a stock yard covered by a 10-ton traveling crane running on trestles. All cold stock is charged into the furnace by a charging machine running on an overhead runway. The ingot molds are stripped and charged into the soaking pits by special charging and drawing machines suspended from crane bridges.

Gas Producers.

On a line parallel with the furnace building is located a plant of 16 Morgan mechanical gas producers, with revolving bottom, hearth and tuyere. The producers are equipped with George patent automatic revolving feeds. Each furnace is fired independently by the necessary number of producers.

Rolling Mill Plant.

The heated ingots are carried from the soaking pits in an electrically-driven tilting chair, which conveys them to the rolling mill building, measuring 216 feet x 150 feet. In this building is placed an Ehrhardt & Sehmer three-cylinder reversing engine, non-condensing, with cylinders 51⅜ x 51⅜ inches. On one side of this engine, and connected to it by a hydraulic coupling, is a blooming mill, which is a duplicate of the blooming mill of the Youngstown Sheet & Tube Co., Youngstown, O. The pinions, which have a diameter of 40 inches, are made of forged steel, and run in oil in hermetically-closed housings. The steel blooming rolls have a length of 80 inches, with a diameter of 33 inches; they are served by tables with 18-inch diameter steel rollers, and by a hydraulic manipulator. The shear is of the steam hydraulic type, with both knives movable. The upper knife is dropped by gravity upon the bloom, and held in position while the lower knife does the cutting. The blooms are transported directly by an overhead charger from the shear table to the rail mill table, or to a reheating furnace placed in the mill building, and fired with gas from the general producer plant.

At the opposite side of the engine, and connected by a hydraulic coupling similar to the one for the blooming mill, is a 28-inch two-high reversing rail mill, with three stands of rolls; the pinions are of forged steel, running in oil in hermetically-closed housings. The rail mill is served by two traveling transfer tables, equipped with steel rollers and mechanism for tilting the bloom as required. From the finishing stand the bar is delivered upon a long line of rollers leading to the hot saw, which is placed in a separate building at a distance of 300 feet from the center of the rail mill.

Behind the saw the cut bars pass over a section of rollers equipped with tilting mechanism, by which they are placed on their flanges before they are delivered upon the double cooling bed, measuring 72 feet x 80 feet.

From the cooling bed the bars are passed through a roll straightening machine, and delivered into the finishing department, which contains the usual machinery for finishing rails and beams and which is commanded by a 10-ton traveling crane. The rails or bars are finally placed on the inspection beds, located alongside of the finishing shed.

Bloom Storage Yard.

Between the mill building and the hot shear building, crossing all the railway tracks in the works, is an elevated crane runway, 1,073 feet long, with a span of 85 feet, forming an ample and accessible yard for stock and materials of every description. This yard is commanded by a 10-ton traveling crane. At one end of the yard is placed an electrically-driven skull cracker.

Machine Shop.

Alongside of the stock yard is placed a machine shop, 216 feet x 72 feet, commanded by a 30-ton traveling crane, with a 5-ton auxiliary hoist, and containing the equipment of tools usual for iron and steel works,—roll turning lathes, large and small machine lathes, horizontal and vertical boring mills, planers and shapers, drill presses, wheel presses, erecting plate and tool-room equipment.

Foundry.

Contiguous to the machine shop is placed a foundry, 192 feet x 72 feet, equipped with two cupolas driven by electrically-driven rotary blowers, core-ovens, brass furnaces and the usual equipment.

Store House and Pattern Shop.

Conveniently located to the foundry and machine shop is placed a three-story fireproof brick and steel building. The two lower floors are used for stores, and the top floor for pattern shop and storage.

Blacksmith's and General Shop.

At the rear end of the above building is located a steel building containing a blacksmith shop providing space for steam hammer, with heating furnaces, blacksmith's fires and the necessary equipment; also boiler shop equipment, consisting of punches, shears, drills and plate bending machine. At one end of the building is provided shed room for four locomotives.

Mill Buildings.

The mill buildings throughout are placed due east and west, with protected gables and open north and south elevations. This will, in the latitude of Sakchi (Kalimati), where the declination of the sun from its zenith is 30 minutes north at mid-summer, and 42 degrees south in mid-winter, procure continuous shade in the interior, and at the same time free circulation of air. The building frames are of steel and of heavy design, so as to withstand the occasional tropical storms. The columns are not less than 34 feet high. The roofs and walls are of corrugated puddled iron sheets.

Railway Equipment.

The railway system in the works consists of about 8 miles of 5 feet 6-inch gage tracks, laid with 75-pound per yard India standard flanged rails resting on Saalwood ties. The rolling stock consists of four six-wheeled yard locomotives, weighing 45 tons each, with separate low back shifting tenders; also the trucks necessary for handling hot metal, slag, waste material, ingots, blooms and pig iron. There are also two traveling steam cranes of six tons capacity, capable of being used for light shunting.

Laboratories.

Adjacent to the shops and steel plant will be placed a brick building containing testing machines and physical and chemical laboratories.

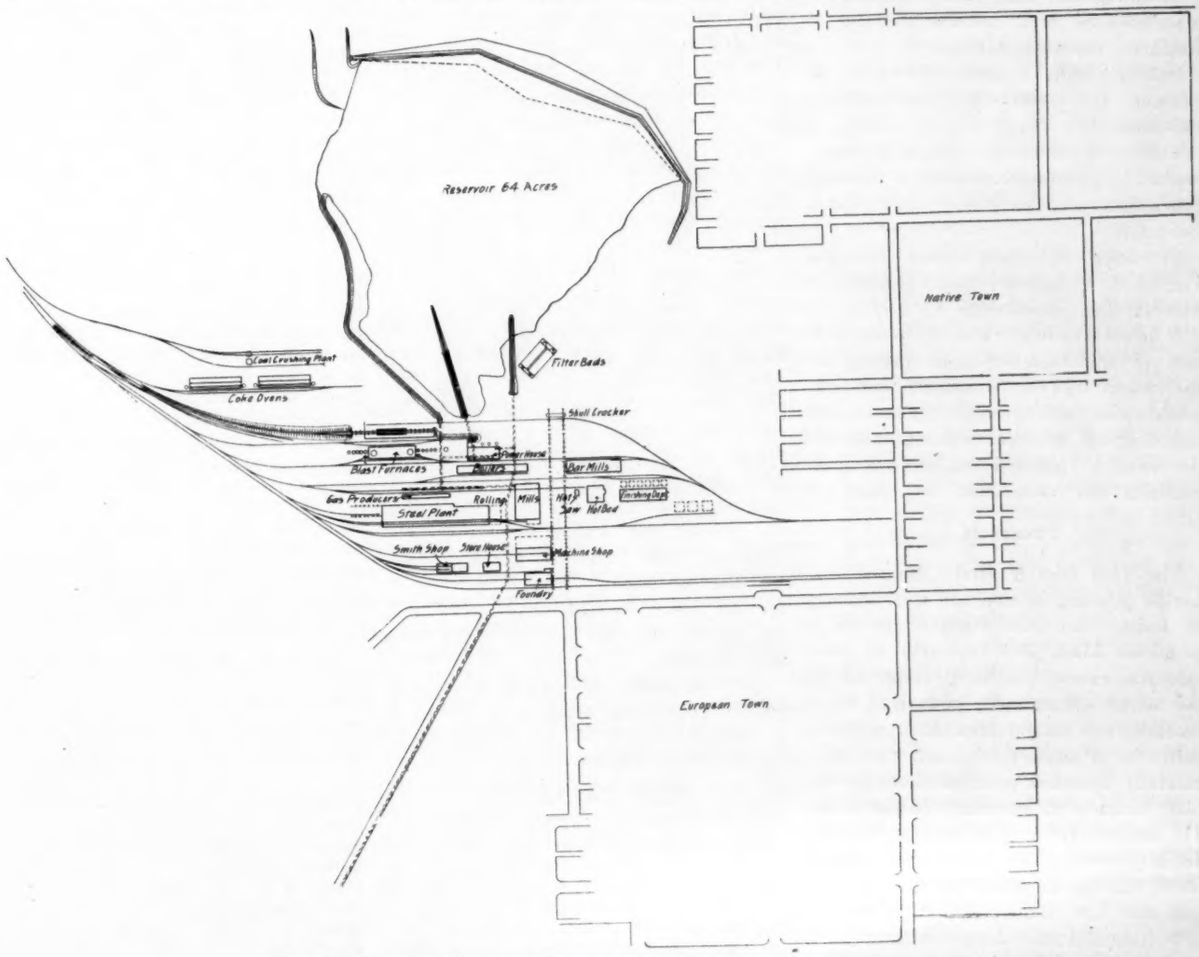


FIG. 2—GENERAL PLAN OF WORKS, TATA IRON & STEEL CO., LTD.

Progress.

Some of the principal contracts for the new plant have been placed with the following firms:—

Cement; Rheinisch-Westfaelisches Cement-Syndikat, G. m. b. H., Bremen.

Rails; Bolckow, Vaughn & Co., Ld., London.

Locomotives; American Locomotive Co., Allegheny Works, Pittsburgh.

Trucks; Arthur Koppel, Soc. Anon., Brussels.

Boilers; Babcock & Wilcox, Ltd., London.

Coke Ovens; Evence Coppee, Brussels.

Steel Buildings; A. & J. Main & Co., Ld., Glasgow and Calcutta.

Iron and steel work for Blast Furnaces, Mixer and Steel and Heating Furnaces; August Kloenne, Dortmund, Germany.

Turbo-Blowers, Turbo-Generators and Transformers; Escher, Wyss & Co., (Lahmeyer), Zurich and Frankfort.

Electric Motors and Accessories; Allgemeine Elektricitaets Gesellschaft, Berlin.

Pumps; Sulzer Freres, Winterthur.

30" Steel Water Mains; Thyssen & Co., Muelheim a. d. Buhr, Germany.

Blooming and Rail Mills; Duisburger Maschinenbau A-G., vormals Bechem & Keetman, Duisburg, Germany.

Rolling Mill Engine; Ehrhardt & Sehmer, G. m. b. H., Saarbruecken, Germany.

Electric Travelling Cranes; Maerkische Maschinenbauanstalt Ludwig Stuckenhols A. G., Wetter a. d. Ruhr, Germany.

Fire-brick; Glenboig Union Fireclay Co., Ltd., Glasgow; and Harper & Moores, Ld., Stourbridge.

A branch railway from Kalimati Station of the Bengal-Nagpur railway to the works site is completed and the foundations for the blast furnaces, steel mill and the principal buildings are under way. The erection of the mill buildings has commenced.

Prospects.

The Tata Iron & Steel Company will not be pioneers in iron and steel making in India. An iron manufacture of a primitive kind, and formerly of considerable extent, has been carried on by the natives during many centuries. More recently, the Bengal Iron & Steel Company, for a number of years, have successfully operated two (at times three) blast furnaces at Barraker, distant about 110 miles from Kalimati, producing foundry iron. The Indian government is operating an open-hearth furnace, and the East Indian Railway Company is rolling old rails into merchant bars, on a small scale. Though none of these enterprises equals in size the new Tata installation, they have served to demonstrate that iron and steel can be produced and rolled in India, and the abundant supply of raw materials which are at the disposal of the Tata Iron & Steel Company, combined with an expanding market for their products, are two important factors which should insure the success of the enterprise.

FULTON EXHIBIT, ENGINEERING SOCIETIES BUILDING.

The Hudson-Fulton celebration which begins at New York on Sept. 25, is essentially a recognition of the explorer and the engineer. To show the relation of the latter to the celebration, models of the Clermont and other early steamboats, through the courtesy of the Smithsonian Institution, are now on exhibition at the rooms of the American society of mechanical engineers in the Engineering Societies building, 29 West Thirty-ninth street. The exhibit includes the Clermont, the Phoenix, built by John Stevens; and one of John Fitch's early types. Original drawings by Fulton, an oil portrait of Fulton painted by himself, Fulton's dining table, oil portraits and bronze bust of John Ericsson, models of the Monitor, all owned by the society, and Ericsson's personal exhibit at the Centennial Exposition, are also exhibited. Through the courtesy of the Hamburg-American line, a beautiful model of the Deutschland shows the highest type of the development of steam navigation.

The model of the Clermont represents the boat as she was on her first trip before undergoing alterations to fit her for regular passenger service. The model of the Phoenix shows that boat at the time of making the first sea voyage ever made by a steam vessel. The trip was made in 1809, leaving New York on June 7 and arriving in Philadelphia on June 17. Fitch's boat was built in Philadelphia in 1786 and successfully tried on the Delaware river. In 1790 a similar boat carried passengers and freight on the Delaware river for several months.

The exhibition will be open to the public every day from 9 a. m. to 5 p. m.

NEW CATALOGS.

INDUSTRIAL RAILROAD MATERIAL.—We have received from the Ernst Wiener Co., 50 Church street, New York City, their catalog No. 200, containing 130 6 x 9 pages, dealing with material of all descriptions for the building and operation of industrial railroads, such as tracks, turntables, special track material, industrial cars, etc. The catalog is printed in both English and Spanish and contains various tables and diagrams of value.

LIFTING MAGNETS.—The Cutler Hammer Clutch Co., Milwaukee, is distributing a very neat 48-page catalog on the subject of lifting magnets, of both crane and hand types with numerous illustrations of application in the average industrial plant.

LARGE NUTS.—The Milton Mfg. Co., Milton, Pa., has sent us a 10-page 6 x 9 inch catalog, briefly but lucidly describing its specialty —large nuts, finished, semi-finished, and case hardened.

FLEXIBLE TRANSMISSION.—The Coates Clipper Mfg. Co., Worcester, Mass., is distributing its bulletin No. 22, containing 66 6 x 8½-inch pages, descriptive of its flexible shafting and the almost innumerable uses to which flexible shafting may be applied, together with numerous special tools and fittings designed for use in connection therewith.

BLAST FURNACE CONSTRUCTION.—We have received from the William B. Pollock Co., Youngstown, O., a booklet containing several large size half-tone illustrations of blast furnace structural work, together with an extensive list of modern furnaces built by them during the past 10 years.

BOLTS AND NUTS.—We have received from the Graham Nut Co., Pittsburg, Pa., one of the most compact and yet complete catalogs of bolt and nut material, washers, blanks, rivets, turnbuckles, etc., that has come to hand. It is neatly gotten up, bound in soft leather and interleaved with section lined memorandum pages. There are 76 pages of catalog matter 4 x 6 inches.

FEED WATER RECORDING THERMOMETERS.—The Bristol Co. is sending out their bulletin 111, descriptive of its Class II feed water recording thermometers, and showing typical chart records from same.

CRUCIBLE FURNACES.—The J. D. Smith Foundry Supply Co., Cleveland, O., has sent us their catalog on standard natural draft crucible furnaces, descriptive of the furnaces and equipment as made by it for brass foundries.

FORGING PRESSES.—The United Engineering & Foundry Co., Pittsburg, have issued a 22 page, 8 x 11 inch, handsomely gotten up catalog descriptive of the high-speed hydraulic press which they are now building under the Davy patents, and which they list in sizes of from 300 to 1,500 tons capacity, this having reference to the power exerted on the ram.

INDUSTRIAL DRYERS.—A new method for calculating drying equipments is described in "Drying in Industrial Plants," a brief treatise just published by the Green Fuel Economizer Co. The book discusses the elementary theory of drying and drying equipments as used in various industries, such as textile plants, tanneries, laundries, factories, lumber and malt drying, etc. The book also contains a chapter on drying engineering and should be of interest to manufacturers and engineers.

FOUNDRY TRAMRAILS.—Bulletin No. 20, published by the J. W. Paxson Co, Philadelphia, is issued by the Moyer tramrail department and is devoted to a discussion of the use of this tramrail in the foundry. The publication consists of about 40 pages, loose leaf style, for addition to the former bulletins of this company, and is so arranged that much information of value to the foundryman is immediately available. The illustrations are numerous and show almost every imaginable adaptation of this tramrail to foundry operations. The booklet was prepared by A. W. Moyer, who recently became associated with the Paxson company and is in charge of this department.

NEWS FROM MANY INDUSTRIES

(In order to assist the post offices in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The following manufacturing concerns have filed articles of incorporation:

The Combination Pocket Wrench Co., Nashville, Tenn.; $25,000; by J. A. Dickey, C. C. Fields and others.

The Pell Motor Car Co., Oswego, N. Y., automobile parts, $150,000; by C. C. Place, A. N. Radcliffe, D. W. Pell, Oswego, N. Y.

The Charles Schlear Motor Car Co., Cincinnati; $25,000; by Charles Schlear, C. K. Dickman, R. M. Scott, J. L. Huddie, and Charles Broadwell.

The Wright-Rye Motor Co., Troy, N. Y., automobiles, $40,000; by W. D. K. Wright, W. H. Rye, Troy, N. Y.; G. A. Hubbard, Loudenville, N. Y.

The Indiana Auto Parts Co., Marion, Ind.; $75,000; by G. R. Stewart, Richard Ruddell, H. D. Reasoner, F. C. Stephenson and J. D. K. Kennedy.

Cobalt Hardware Co., Ltd., Cobalt, capital $50,000, by Douglas L. Jennett, Langdon B. Wood, Fred A. Moss and others.

Imperial Motor Car Co., Ltd., Toronto, capital, $500,000, by Darwin C. Jones, Fred Hatch, George Gillies and others.

The Ideal Auto Starter Co., Indianapolis, Ind., $25,000; to manufacture auto parts; by W. K. Bells, S. P. Woodward, A. L. Smith, R. T. Snapp and N. D. Woodward.

The Gurney Ball Bearing Co., Jamestown, N. Y., machinery, bearings, ball bearings, etc., $600,000; A. W. Kettle, F. W. Gurney, W. H. Kidder, Jamestown, N. Y.

Tobin Arms Mfg. Co., Ltd., Woodstock, Ont., capital $100,000, to manufacture fire arms and metal specialties, by Kenneth Harvey, Henry A. Little, A. J. McIntosh and others.

The C. H. L. Keeler Co., Ltd., Toronto, capital $40,000, to manufacture electrical apparatus, machinery, etc., by Robert H. Nesbitt, Charles W. Ball, James A. Johnston and others.

The Orvo Mfg. Co., New York City; embossing machines and dies; $50,000; by C. I. McLaughlin, 71 Duane street; Louis H. Orr and Willis E. Frost, 119 West Twenty-fifth street, New York City.

The Nappanoch Knife Co., Warwassing, N. Y.; knives, cutlery, and edge implements; $75,000 capital stock; by William L. Hoornbeek and Irving E. Carman, Ellenville, N. Y.; William Carman, Napanoch, N. Y.

The Miller Motor Co., New York; Miller rotary engine; $30,000; by Charles Miller, 132 East Fifty-seventh street; Lawrence H. Cummings, 183 Third avenue; George W. Schaefer, 216 East Seventeenth street, New York city.

The Washington Engine Works, New York City; engineering, manufacturing engines, boilers, etc; $50,000; by William A. White, Ada A. White, West Hoboken, N. J.; Benjamin H. Oliver, 535 Seventy-fifth street, New York City.

B. G. Underwood Co. Inc., Boston; vending machines; $50,000; by President, Bertrand L. Chapman, 78 Central street, Auburndale; treasurer, Harry Haskell 2nd, 115 West Newton street, clerk, B. G. Underwood, 330 Nimball building, Boston.

New Construction:—

The Mason Automobile Co., Waterloo, Ia., is about to erect a new factory building there.

Work has been started on the new South Warwood plant of the Spears Axle Works, Wheeling, W. Va.

The Hastings Foundry & Iron Works, Hastings, Neb., is to build a foundry 60 x 100 feet, with a pattern shop 40 x 100 feet.

The Howard Safe & Vault Co., Atlanta, Ga., has increased its capital stock from $75,000 to $500,000, and will build a new plant in the outskirts of Atlanta.

The Interstate Construction Co., Helena, Ill., has let a contract to the Des Moines Bridge & Iron Co., Des Moines, Ia., for the erection of a power house to cost $150,000.

The Aspinwall Mfg. Co., incorporated under the laws of Michigan, has been licensed to manufacture farming implements at Guelph, Ont., on a capital of not more than $40,000.

The Corrugated Steel Culvert Co., which was recently incorporated with a capital of $20,000, announces that it proposes to build a plant in Owosso Mich. C. Holden, of Yale, Mich., is general manager of the plant.

The Ingersoll Milling Machine Co., Rockford, Ill., has found it necessary to enlarge its plant. The new building will probably be 50 x 100 feet, one story, concrete construction. It will be used for erecting the small machines which are manufactured by the company.

The Hayes Rapid Tunnelling & Mining Machinery Co., Birmingham, Ala., recently acquired three acres in Queenstown, Ala., and will erect a plant there which it will use for the manufacture of mining and tunnelling machinery, compound turbine engines and mine pumps. The manufacture of mining machinery is a new enterprise in the Birmingham district.

The Menough Foundry Co., Wellsville, O., which was visited by fire recently, announces that it will rebuild at once and that the shut down caused by the blaze lasted only a week. The building destroyed was a frame foundry 150 x 40 feet and the damage was about $5,000. The new building will be of the same dimensions as the old one and will be either brick or concrete.

The Seaboard Steel Casting Co., Chester, Pa., has decided on an addition to its foundry and has invited bids for the erection of a foundry of steel and brick 80 x 60 feet to be built as an extension of the present foundry. A 30-ton crane now in the machine shop is to be supplemented by another of the same general design and a 50-ton crane is to be placed in the main runway of the foundry to be used in pouring heats.

The Sternberg Mfg. Co., Weil and Burleigh streets, Milwaukee, has been forced to increase its capacity, following its successful venture into the automobile truck field, and will at once erect a plant at West Allis. The company also makes cigar box machinery. It moved to Milwaukee from Davenport, Ia., four years ago. The plant will be of concrete construction, 200 x 350 feet, one story and will give employment to 300 men. Two hundred trucks will be turned out annually, police and fire patrol trucks being a specialty.

General Industrial:—

The plant of the Waukesha Motor Co., Waukesha, Wis., is nearly completed and ready for the installation of machinery.

The DeForest Steel Co., Niles, O., will be placed in operation Oct. 15. Machinery has been installed and the company expects to employ about 800 men.

It was announced from Steelton, Pa., that for the first time in two

years, every stack of the Pennsylvania Steel Co. was in operation and every department of the works busy.

The Mallory Machinery Co., which was recently incorporated in Macon, Ga., was intended to take over the business formerly conducted by the Mallory Bros. Machinery Co.

The Metal Specialty Co., Cincinnati, announces that it has secured headquarters at 208-214 Elm street, of that city, and will manufacture an extensive line of metal specialties.

The Standard Sanitary Mfg. Co., Pittsburg, has purchased seven acres in Toronto from the Canada Foundry Co., at $5,000 an acre, and intends to build a plant in Toronto.

The Connellsville Iron Works, Connellsville, Pa., has purchased boiler shop equipment formerly owned by J. C. Sloan. The Iron Works has taken possession and will add new machinery to the plant.

Consul A. G. Seyfert, Owen Sound, has reported to the state department that the Georgian Bay Power Co. has increased its capital to $150,000 and will complete a 3,000-horsepower hydro-electric plant.

Creditors of the Beaumont Iron Works, Beaumont, Tex., have petitioned the court to have the plant sold for an upset price of $75,000. They allege that operation under the receivership is not a success.

The Standard Ideal Co., Port Hope, Ont., the Amherst Foundry Co., Amherst, N. S., and other manufacturers of cast iron enameled goods in Canada have formed a merger. The capital involved in the deal is stated to be about $2,000,000.

The Brantford Steel Range Co., Ltd., Brantford, Ont., which was incorporated about two months ago, has already begun the manufacture of the Stanford steel range, an invention of W. R. K. Stanford, manager of the plant. The company expects to begin the erection of a new plant some time next year and will install modern machinery and appliances.

The Falls City Machinery & Supply Co., Spokane, Wash., which has been incorporated with a capital of $50,000, has taken over the plant of the Syphers Machinery Co. in that city, and will install additional machinery. The plant is also to be enlarged. The officers of the new company are L. F. Boothe, president; William Watterson, vice president, and George M. Holt secretary.

The Chicago Railroad Equipment Co. has been brought into court in proceedings for the appointment of a receiver. The bill was filed by Henry D. Laughlin, one of the stockholders, who complains of the management of the company by President E. B. Leigh. The trouble is the consummation of a long continued disagreement between different interests in the company.

Articles of incorporation were filed Sept. 15 by the Baltimore Steel Car & Foundry Co. The company is capitalized at $1,500,000, and will acquire the plant and assets of the South Baltimore Car & Foundry Co., which was recently sold on foreclosure. The new company is the one which is negotiating with the Standard Steel Car Co., Butler, Pa., for the sale of the Baltimore plant.

The Pope Mfg. Co. is carrying on negotiations for the purchase of the tube works in Hartford, Conn., belonging to the Shelby Steel Tube Works. The Pope company originally owned this plant and sold it. When the plant is acquired again, it is proposed to give it the necessary repairs and use it in the manufacture of automobiles. The Pope company now has about 1,200 men at work in its Hartford plant, and 500 in the Westfield plant.

The United States government, through the geological survey, has completed an investigation of the amount of metals recovered in this country from skimmings, drosses, by-products and other sources. It is found that in the year 1907, 30,240 tons of copper as raw material or in alloys was recovered, the value of which was $11,188,800; lead amounting to 9,900 tons, valued at $2,702,000; zinc in alloys amounting to 1,417 tons, valued at $2,390,444; 93 tons of tin, valued at $914,404; 15,508 tons of lead in alloys, 18,440 tons of spelter, and 1,569 tons of zinc in **alloys** were recovered.

The American Electric Tool Co., Petersburg, Va., a recent incorporation, advises that its plans regarding building and equipment are not yet mature, but that it contemplates the building of a plant at a cost to approximate $100,000, which will include a foundry with full equipment for light castings. The American Electric Tool Co. has taken over all the patents, machine plant and good will of the Virginia Electric Tool & Mfg. Co., and will place upon the market an electric hammer for use in both the stone and iron trade. The officers and directors of the company are: Louis Paulero, president; W. G. Andrews, vice president; W. H. Wilcox, secretary and treasurer; Charles H. Cuthbert, B. B. Jones, J. McS. Buchanan and H. P. Harrison, all of Petersburg, Va.

The Chicago Machinery Exchange, 159-161 North Canal street, Chicago, has purchased a new site on Washington boulevard and Ann street, that city, and proposes to erect a three-story building, 100 x 200 feet at a cost of $75,000. The exchange will occupy the basement and first floor, giving it about 40,000 square feet. The other floors will be rented to related businesses. The exchange is interested in obtaining some form of transporting machinery to handle machines on its floors, and should like to get in communication with firms installing such appliances. President Waldemar Giersten, of this company, believes that in moving the business to Washington boulevard, the exchange is joining a movement which will eventually make that street the machinery center of Chicago.

The Canada Producer & Gas Engine Co., Toronto, announces through E. C. Hill, managing director, that actual manufacturing will begin at the plant in Barrie, Ont., in about 60 days. The company proposes to make gas, producer gas, and gasoline engines, pumps, hoists and other articles. It is capitalized at $350,000 of which $200,000 is preferred stock. Sufficient of the capital was subscribed to pay for buildings, land and machinery and arrangements were made by which the town of Barrie advances a loan of $40,000, furnishes free light and water up to $600 per annum and guarantees an assessment of not more than $20,000 for 20 years. The company already has its equipment. The plant occupied is one formerly belonging to the Dyment Foundry Co. which was burned about two years ago and was in process of rebuilding when the Canada company took it over. S. Dyment, president of the Barrie Carriage Works and connected with other concerns, is president and William Thompson manager of the works.

Fires:—

Fire visited the plant of the Hagerstown Foundry Co., owned by A. T. Zentmyer, Hagerstown, Md., Sept. 7, causing damage estimated at $3,000.

The plant of the Rockingham Foundry & Screen Plate Co., Bellows Falls, Vt., was badly damaged by fire early in the month. The fire originated from a melting furnace used in melting brass.